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THE Airman

OFFICIAL JOURNAL OF THE AIR FORCE

OCTOBER 1959

THE SHAPE of THINGS TO COME

by

Lt. Gen.

Bernard A. Schriever

COMMANDER, AROC

GOVERNMENT
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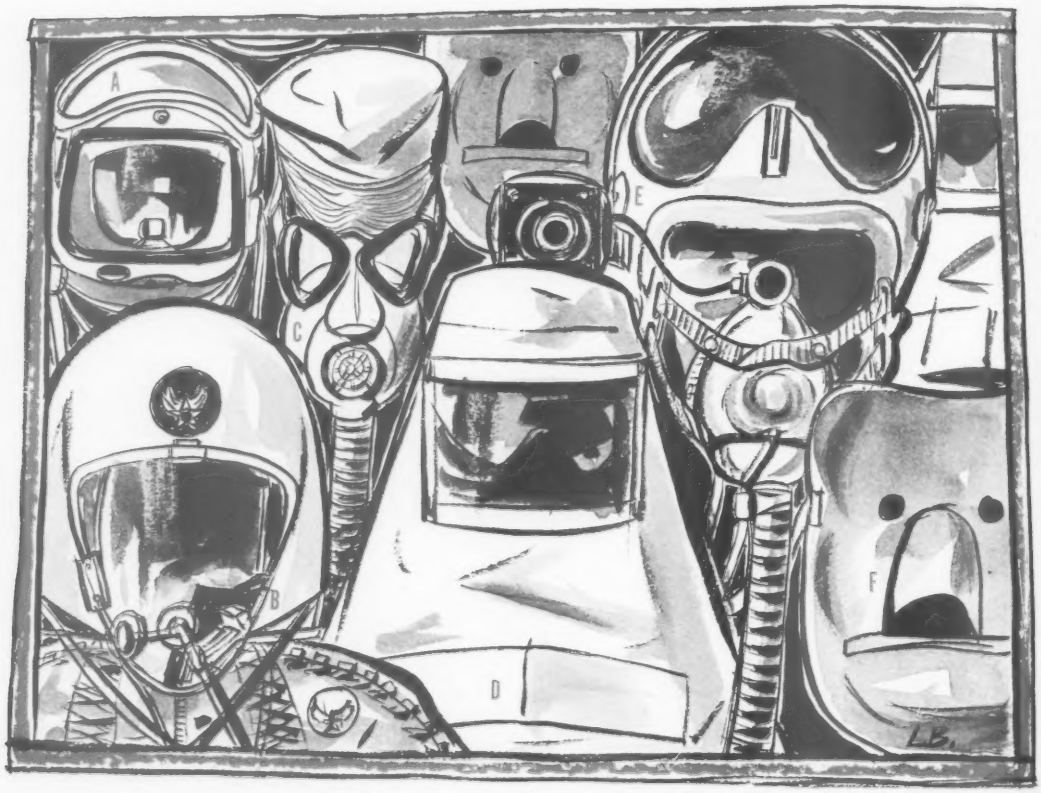
HALLOWEEN GOBLINS?



No, only some of the Air Force's operational and experimental headgear.

A—Experimental space mask; B—Space helmet equipped for liquid food feeding; C—Old standby, gas mask; D—Chemical, biological, and radiological protective clothing; E—Flight helmet with camera attached (courtesy Convair); F—Arctic face masks.

THE Airman

OFFICIAL JOURNAL OF THE AIR FORCE

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Use of funds for printing this publication approved by the Secretary of the Air Force and the Director of the Bureau of the Budget July 5, 1956.

LETTERS TO THE EDITOR

WRONG UNIT

Sir: *I have just finished the article* Wounded Aboard *in the July issue of* THE AIRMAN. *If you haven't already received a correction, I would like to offer the information that Lieutenant Mathis was a member of the 359th Bomb Squadron, 303rd Bomb Group, 41st Combat Wing—not the 305th Group as indicated. The 303rd was known as the "Hell's Angels" Group and we former members are justly proud of the unit and the fine men who served with it during the war.*

Maj. Emerson E. Heller
McClellan AFB, Calif.

Sir: *The mission to Vegesack, as described in the article* Wounded Aboard, *was flown by Lt. Jack Mathis as a member of the crew of* The Duchess. *The ship was piloted by Capt. Harold Stouse and belonged to the 303rd Bomb Group.*

Maj. Harold A. Susskind
L. G. Hanscom Field, Mass.

Sir: *Lieutenant Mathis was a member of the 303rd Bomb Group, stationed at Molesworth, England, at the time of the incident reported by Sergeant Bamford. I flew the aircraft in which he was killed after the original crew had rotated back to the ZI. I was not there at the time of the incident, but have always been very proud of the fact that I was associated with the fine tradition established by this outstanding hero.*

Maj. K. C. Edwards
APO 323, San Francisco, Calif.

Sir: *I was a member of the 303rd Bomb Group at the time that Lt. Jack Mathis was killed. I think you erred in placing him in the 305th.*

MSgt. Stephen Mudge
Detroit, Mich.

If the 303rd Bomb Group ever decides to hold a reunion, the process of locating the people should be comparatively easy — Sergeant Bamford has heard from most of them. To all who wrote or called THE AIRMAN, our thanks for helping us correct the error.

★ ★ ★

YOU'RE WELCOME

Sir: *I would simply like to express my thanks to the editors for including a picture of a* Spitfire *in the montage*

Continued on page 43

The Air Force
Doesn't Overlook

YOUR BETTER HALF

by MSgt. Paul J. Turner, *Airman Staff*

OTHER officers sensed that the captain was worried as the TDY squadron's pilots got their garb on for a day of supersonic target chasing.

On the same base in a GCA trailer a tired sergeant rubbed his eyes, trying to clear the fog on the screen he watched, and nearby in wing headquarters a lieutenant in personnel threw his fifth sheet of crumpled paper into a half-filled wastebasket.

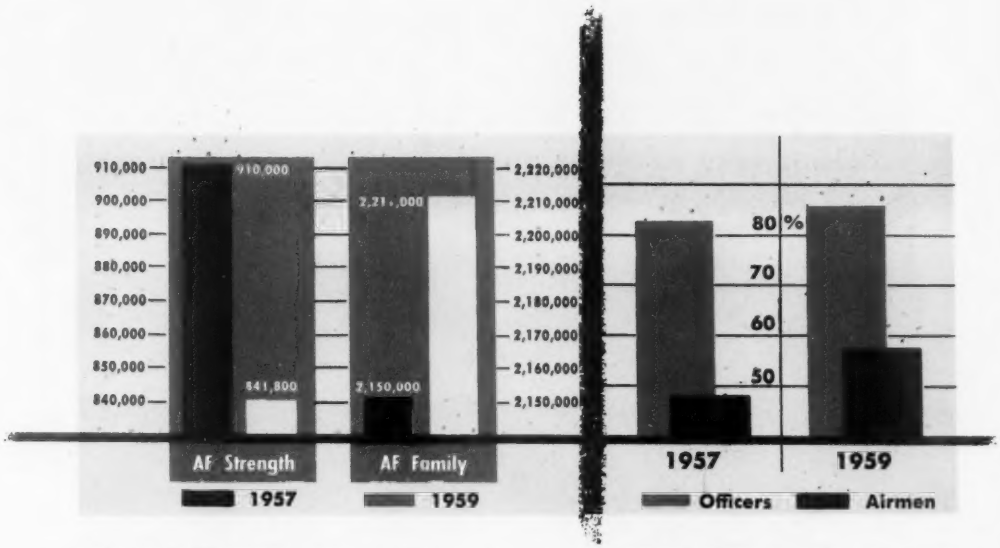
What's wrong? This isn't the coordinated effort that makes airpower. The captain is in jeopardy if he can't devote full concentration to his supersonic fighter. The sergeant's fog could blur a blip and cause a crash. And personnel reports must be clear and concise. What's sabotaging these men's work?

The captain was worried because this was the first day he hadn't received a letter from his wife back at the home base. The sergeant had awakened several times during the night when his six-month-old baby cried. And the lieutenant left his wife in a house full of newly-arrived household goods. He now worried about the morning task she faced.

Three phones rang. Long distance for the pilot . . . the wife and family were fine and there'd surely be two letters tomorrow. The sergeant learned that his baby's temperature was back to normal and his disposition much better. The lieutenant was told that six volunteers from the Family Service Center had arrived to pitch in and help.

So it goes, day-in and day-out. Air Force wives and families continue to exert a most profound influence on Air Force operations.

The reason? Here's the way officials at Randolph AF Base, Tex., explained it recently when they established a Family Living Program: "No Air Force officer



AIR FORCE STRENGTH has dropped some 68,000 while the total USAF family has grown 61,000 larger.

MARRIED PERSONNEL continue to increase in number—reflecting the family's interest in Air Force career.

or airman can be worried and harassed, puzzled and baffled by what happens in his home, and leave it all outside the gate of the military establishment when he reports for work." This one sentence neatly wraps up a factor under constant consideration by Air Force leaders at all levels.

A Mature Air Force

The domestic influence has always been important in the Air Force and if present trends continue it will become even stronger. The Air Force "family" is growing despite downward trends in total active-duty strength. Two years ago USAF strength was around 910,000 and the Air Force "family" (assigned personnel and their dependents) tallied some 2,150,000. Today's strength is about six percent less, approximately 841,800, yet, instead of making a parallel drop to about 2,000,000, the "family" has increased to 2,211,000. Further, in 1957, 82.5 percent of all officers were married while today 85 percent are. In the enlisted category the married figure has risen from 47.7 to 57.1 percent.

The Copilot

What type of woman is the average Air Force wife who carries the important responsibility of copiloting her husband's career? Is she different from other women, other wives? When you compare Air Force wives with their civilian counterparts many differences instantly come to mind. First and foremost the Air Force wife must play "second fiddle." When her husband took his oath of enlistment or commissioned service, he pledged himself to serve the interests of his country honestly and faithfully. He assumed greater responsibilities by affirming to obey the orders and regulations established to guide his dedication to his country. These affirmations he placed first in his life.

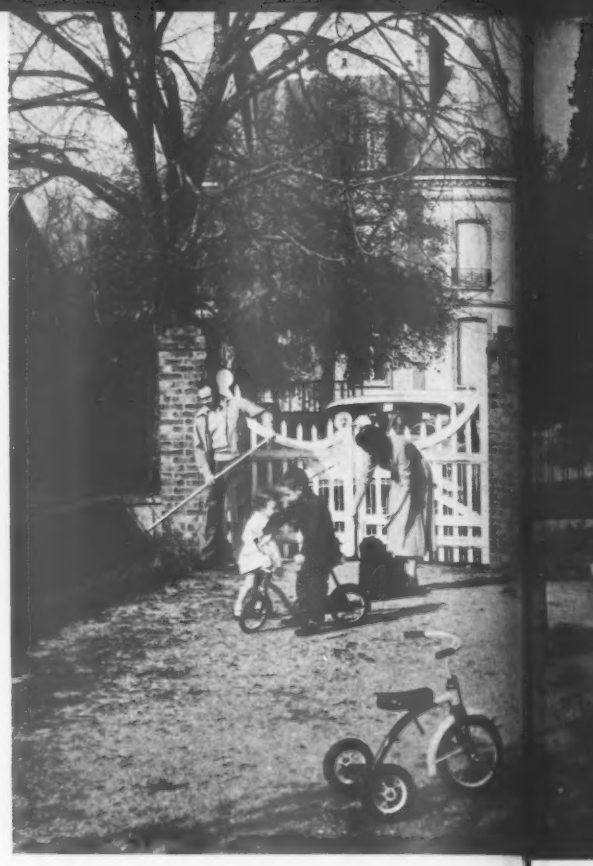
Consequently, TDY trips, CQ or duty officer details, overseas movements, alert duty, transfers, and many more exigencies of the service interrupt the normal development of family life as most civilians know it. Unlike others, the serviceman can't walk off his job nor can he shirk his duty. The seasoned Air Force wife realizes this and patriotically accepts her role. She knows too that should war or a serious emergency occur, her husband in unifrom would be among the first to go. She lives with this constant, but suppressed fear.

Air Force families often must lead a nomadic type of existence. Each PCS move requires adjustment to a new community. Each move means new schools, doctors, dentists, food stores, dry cleaners—and setting up housekeeping again. These changes the Air Force wife and family accept as routine. And often the hardships are lost in the mind of the man, himself busy adjusting to a new base, a new job.

How does the family overcome these problems? Air Force and Congressional actions help. Efforts of the wives and families are important and the individual officer or airman has an important role.

Top to Bottom

General Thomas D. White, USAF Chief of Staff, has stated, "Our people in a peacetime situation should expect and are entitled to at least the same standard of living enjoyed by other citizens . . ." This sentiment prevails Air Force-wide and those things causing the greatest discomfort are receiving priority attention. For years adequate family housing has ranked close to pay and promotion as the most vital elements in career



plans. There has been a continuing improvement in this housing effort. But housing is not the only problem being solved. The Air Force has also adopted a Personnel Facilities Program that reaches out to build a family community on each base. Service clubs, chapels, theaters, off-duty education programs, libraries, swimming pools, dependent schools, new hospitals, base exchanges and commissaries, clubs, and varied recreational facilities for both in- and out-door living are in the master plan for major USAF installations.

The dislocation allowance helps offset family transfer expenses. AFM 34-7 gives official support to the Family Services Program (see *Assistance Unlimited,* March '59 AIRMAN) in which wives perform volunteer work to help each other. New survivors' benefits and social security laws are designed for the wife and children.

Medicare was designed exclusively for the serviceman's family and an appropriate Denticare bill is also under study. Also there are many more family oriented programs, some in effect and others planned or supported by USAF. The USAF's concern for the family's well-being even extends beyond retirement. A good example of this is the Uniformed Services Contingency Options Act, which provides a form of insurance for retirees' families.

Travel of dependents to overseas areas has been broadened in a continuing program. Concurrent travel overseas has reached a new high. In 1957 only one percent of the families moving overseas accompanied the head of the house. Last year 47 percent of the 56,000 Air Force dependents who went overseas, traveled as family groups. Recent figures reveal also that 95 percent of all USAF moves were by air. These speedy air movements eliminate the many hardships of long surface voyages during which cabin baggage is often inadequate, laundry facilities limited, and living in general cramped and restricted.

The wife and family are considered in countless other ways. Many unit commanders conduct periodic orientation and open house programs exclusively for families. Of these most commanders find it effective to keep "hubby" on the job so the wife can get a better understanding of both the organization's mission and what the breadwinner does away from home. Unit parties for personnel and their families are also effective in binding the "total" organization together. As one Hamilton AF Base, Calif., squadron commander put it: "Explaining Dad's job to dependents firsthand is the most dramatic way I know of making them feel they are part of the Air Force family team. The more families learn about the work of their husbands and fathers the easier it is for the man to work at full capacity. The man's attitude is better because he knows his family realizes the importance of his job."

Kaffee Klatch

Wherever you find Air Force dependents, you'll also find wives clubs or similar groups. Invariably these women, with parallel problems and service backgrounds, join in officers, NCO, airmen's, squadron, or some other form of social club. Usually the work they perform and the influence they exert is exceptional and the size of the installation or its location doesn't restrict their activity.

At Olathe AF Station, Kansas, the AC&W unit's newspaper *The Teller* recently kicked off a program

TSgt. Ralph Brabon and family in Europe, like other Air Force families, find PCS moves into new overseas and ZI areas offer a chance to broaden education and make new friends.

to form a family-type club. At Randolph AFB things are done in a bigger way. At that base women group into neighborhood flights and groups in an elaborate Family Living Program.

Every base newspaper devotes columns to activities of women's groups. To many, these reports are thought of as "For Women Only." However, if you read the items carefully you'll find more than social items, notices of tea and bridge parties, and style shows. Important projects are undertaken by these wives. In many instances scout and youth groups are sponsored. The base clubs maintain close ties with similar wives groups in the local civilian community and through their efforts greatly enhance the base-community relations. The attitude and conversation the wife displays in her daily contacts with civilian neighbors and shopkeepers has a profound influence on how the community feels about military personnel in the area. At group meetings wives discuss common problems and develop suggestions or solutions.

In many overseas areas they conduct language classes to help all wives in their daily associations with people of the native community. In other educational areas these women not only join in formal education classes but often sponsor seminar type classes on home economics, child care, hair styling and similar domestic subjects.

They tackle such large projects as base beautification, operation of Family Services Programs, maintenance of child care facilities for working or hospitalized mothers, hospital volunteer duties and many more. Of course the individual family situation determines how little or how much time a wife can devote to these programs. In some instances wives are awarded pins and certificates denoting contributions of hundreds and often thousands of their free hours to this type work.

Money, Morale, Mission

But when you're passing out bouquets, remember that all wives' contributions aren't made en masse. Individual wives solve personal problems and provide continuous help to overcome service hardships. In instances when service pay just isn't enough, the wife will take a job in exchanges, civil service, and other on- and off-base employment.

Faced with monthly or twice-a-month paydays, the wife develops and employs a family budget early in her service career.

During forced separations from TDY, overseas PCS, and other varied circumstances, letters from the wife are considered one of the most potent morale boosters. During WW II the wives at Ft. George Wright, Wash., purchased a tape recorder, and each "heir force" arrival cried his greeting onto tape which was quickly dispatched to his overseas daddy.

A woman's touch is also helpful in performing a unit mission. A recent case in TAC illustrates what can be done. This woman's airman husband was constantly

bruising his knuckles while loading a certain type of armament. She finally asked if she could come to the base and watch him work. From her orientation she designed and made a special pair of gloves that gave him the flexibility needed for the work yet protected his knuckles.

Along with rising reenlistment figures, an increase in the size of the Air Force family, and a higher percentage of married personnel, there has been an increase also in the educational level of all ranks. This is in part a tribute to those wives who encourage and help their husbands in off-duty education. In fact on any average size USAF base you can find several examples of both husband and wife attending off-duty classes together. In families where dad is involved in off-duty training, the wife provides the proper home setting to permit homework studies.

Hubby's Help

Efforts of the Air Force and the wives themselves to offset service hardships are coupled to a third source of help which comes from the man himself. The most content Air Force wives have husbands who encourage them to take part in base activities. These husbands discuss their unclassified work, promotion prospects, policy changes, and other subjects as freely as they do junior going to summer camp. In such cases also, the base newspaper and other publications are brought home so that the "better half" can keep informed.

A content Air Force wife seldom if ever hears her husband grumble about petty day-to-day grievances. Regardless of rank or income, the budget must allow for at least an occasional evening out. A few words of praise for the wife and children as they meet the challenges of service life have the same morale building effect for them as such words from the commander have for you. The medals and honors available to deserving officers and airmen cannot be awarded their wives, but in many instances the wife is at the recipient's side during the presentation ceremonies—a fitting tribute to her role in the Air Force mission.

Commander's Notebook

Col. Thomas S. Torresson, Jr., Hahn AB, Germany commander, recently summed up the role of the Air Force family in these words, "In the Air Force, it's not simply a matter of adjusting meal time and other events to suit the working schedule of the head of the house. It takes *courage, sacrifice,* and *loyalty* from every member of the family to keep the Air Force man doing his best in fulfilling our most important mission throughout the world."

THANK YOUR LUCKY STARS

by George Mark

Just imagine finding this little item on the bulletin board:

"The number of women allowed by the Government to embark on service are six for every hundred men, inclusive of all noncommissioned officers' wives."

Yes, this is an actual quote from British Army regulations on the subject of dependent wives, circa 1801; and the more you delve into the topic, the more you Air Force gals ought to thank your lucky stars you weren't a service wife in the 19th century. Relax a minute and read what your sisters, the British dependent wives, had to put up with.

To start with, the British military frowned on their lieutenants (beg pardon, leftenants) getting wed at all. Any subaltern in a regiment of horse or foot who walked up the aisle say 150 years ago was liable to be fined 100 pounds by his unit.

The chief reason apparently was that his fellow officers feared lover boy, now that he was getting home cooked meals, would spend far less money in the mess.

Too many young officers getting hitched meant such a drop in income that the menu would consist of nothing except fish and chips every day. Hence the wedding "fine" —(a) to discourage the Romeos, and (b) to salvage something for the mess funds.

In the year of grace 1889, a certain Lt. Gen. Sir William Bellairs published a guide book for every young officer who intended to make the service his career. On the question of wives, his advice was quite clear.

"Subalterns must not marry," decreed the good general. "Captains may marry, majors should marry, colonels must marry."

If an officer did get wed, Sir William told him firmly what was in store.

"Married to a healthy young woman you cannot reasonably expect to have fewer babies to provide for than one in every second year, six children after twelve years of married life, and very possible more to follow later on."

No wonder the British became empire builders.

During the occupation of New York, the redcoats had their worries about dependents. We know from old records that the British garrison in the 1770s ran a dramatic club, all proceeds of its shows being used to keep the dependent wives from starving.

It's interesting to note that, British or American, a military wife has a great deal of influence on the morale, efficiency, and fighting spirit of her hubby's outfit. Sometimes, of course, the womenfolk can't resist forming themselves into pressure groups.

That was the reason one British field marshal, Lord Kitchener, attempted to compel officers to "order" their wives to desist from such activities because they were "subversive of discipline."

It's almost pointless to add that Lord Kitchener was a mere bachelor. Otherwise he would never have tried.

Housing has always been a major bugbear for a military family overseas.

Just to prove the point, here's an extract from an officer's account of his experiences, published 1841:

"The sergeant of our guard, being a married man, considered himself fortunate in having secured a small pig-sty near his post for his wife's accommodation; and the poor woman felt happy in its possession, small as it was . . ."

—*UK Eagle,* APO 125, N. Y.

YOUR AUTO-- BE SURE !

by Lt. Col. Jake L. Abraham
Office of The Judge Advocate General, USAF

Do you own a car? Then chances are you have had to decide where to license it.

A civilian seldom has this problem. When he moves into a new state he *must* license his car there within a certain period of time, usually two months.

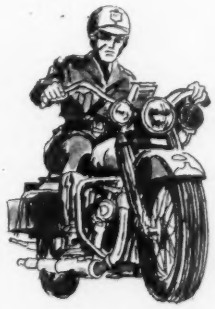
You as a serviceman are given a break. You have the choice of being permitted to license your car either in your home state or in the state to which you have been transferred. That's because a Federal law, the Soldiers and Sailors Civil Relief Act, was passed solely for your benefit.

A word of caution: Don't abuse the privilege you have been given. Some servicemen look around for still another state where taxes seem less and get an automobile license from that state. If you do, you may be charged for driving with an improper license and required to pay a fine. Then you must still buy a proper license for your car; that is, one from your home state or the state where you are stationed. The result is that you have cost yourself money instead of saving any.

Dependents Excluded

From a tax point of view, there are certain disadvantages to joint registration of your car, too. You see, section 514 of the Soldiers and Sailors Civil Relief Act applies only to you as a serviceman. Your wife and other dependents, unless they are in the service, are not covered. Any car licensed in your wife's name, or jointly in both names, must nearly always have a license from the state where you are stationed if the car is kept in that state.

Since your wife is a civilian and owns property—the car—then she is required to pay all taxes that are levied by the state where she actually resides. If the car is jointly owned, she will be taxed on her half of the property.



Since the laws vary from state to state and within a particular state from time to time, there is no pat rule of thumb that would apply in all cases. All factors considered, it is generally better to maintain your automobile registration in your home state and in your own name, but each individual case should be examined separately. An important point to remember here is that by continuously registering your car in your home state (that is, your legal residence or domicile) the mere fact you do so is *some proof* that that state is actually your legal residence. And some people, particularly servicemen, need all the proof of legal residence they can muster. The best thing to do is consult your legal assistance officer concerning proper registration of your car.

Driver's License

Most states require that your license plates and driver's license "match." That is to say, if your car is registered in your home state, you must have a driver's license from that state. On the other hand, if your car is licensed in the state where you are stationed, then you must obtain a driver's license from the same state. In practically all states, your civilian dependents must be licensed to drive by the state where they are living within a short time after their arrival in that state. This time may vary from 10 days to several months.

This article is not intended as a cure-all for the headaches you get in trying to decide where to buy your driver's and car licenses. Instead, it is intended to alert you to some of the problems involved and of the fact that there is someone available with the right answers—your legal assistance officer. See him, with all your papers in hand, *before* you act. In the light of all the other factors involved, such as sales and use tax, proof of ownership, special county or city licensing laws, plus a proper determination of your legal residence, he will advise you what to do.

BE SURE !

Remember too, that although the civil relief act is a Federal law, it is quite often interpreted by state authorities. States vary in their interpretations. Being a lawyer, your legal assistance officer is familiar with the local interpretation of the laws that affect servicemen most.

EXTRACT FROM SOLDIERS AND SAILORS CIVIL RELIEF ACT

Section 514

"(1) For the purposes of taxation in respect of any person, or of his personal property, income or gross income, by any State, territory, possession, or political subdivision of any of the foregoing, or by the District of Columbia, such person shall not be deemed, to have lost a *residence* or *domicile* in any State * * *, *solely by reason of being absent therefrom in compliance with military or naval orders,* or to have acquired a *residence* or *domicile* in, or to have become a *resident* in or a *resident* of, any other State, * * *, while and solely by reason of being so absent. For the purposes of taxation in respect of the personal property, income, or gross income of any such person by any State, * * *, of which such person is not a resident or in which he is not domiciled, compensation for military or naval service shall not be deemed income for services performed within, or from sources within, such State, * * *, and *personal property shall not be deemed to be located or present in or to have a situs for taxation,* in such State, * * *.

"(2) When used in this section (a) the term 'personal property' shall include tangible and intangible property *(including motor vehicles)* and (b) the term 'taxation' shall include but not be limited to licenses, fees, or excises imposed in respect to motor vehicles or the use thereof: *Provided, That the license, fee or excise required by the State, * * *, of which the person is a resident or in which he is domiciled has been paid.*" (Italics by Editor)

YOU GUESS

Pointing your finger is not bad manners in Vermont. In fact, it is the approved and required way to signal a *left turn* from your automobile. Approved, that is, if you use your left hand and arm; turn the palm to the front; point with the index finger only; and keep the arm stationary at right angles to the body.

If you plan to *stop* or *slow* your car you must extend all your fingers, palm to the front, arm stationary, and still at right angles. To signal a *right turn* your arm and hand must be extended straight upward with the hand stationary.

According to a digest of motor laws and traffic rules compiled by the American Automobile Association, at least nine states besides Vermont require hand signals that differ from those most commonly used. In most states people expect a *left turn* whenever the left arm is extended horizontally; a *right turn* when the arm is bent or extended upward; and a *stop,* or *slowing,* when the arm is slanted downward, usually with the palm turned warningly backward. An agitated downward or backward slapping motion is usually interpreted as a driver's urgent warning of a danger he knows you cannot see.

Now if you are touring Connecticut and the driver in front of you starts waving his arm up and down, he's warning of danger all right, but because he is going to make a *left turn.* That's the approved signal in that state. He would really confuse the tourist from Vermont when he signalled a *right turn,* because he would then point an accusing finger just as the Vermonter would signal a *left turn,* only the Connecticut driver would also rotate his hand. Of course that isn't too far-fetched because most people would interpret it as saying, "it's all right for you to pass me on the left."

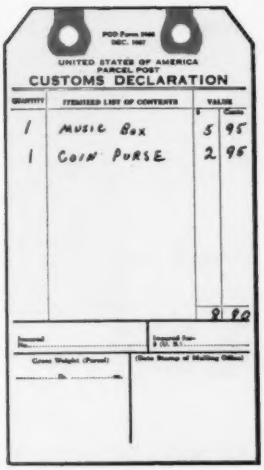
It's all right to use automatic turn signals in Connecticut the AAA digest says if "signal is understandable, given in sufficient time before turn is made, and properly indicates the turning movement."

The rule is just a little different in Massachusetts where hand signals are required on all highways, although automatic turn signals are permitted. The Bostonian simply points horizontally with the index finger for a *left turn.* Not pointing, but rotating his hand at the end of an extended arm he signals a *right turn.* To signal a *stop* he just extends his arm horizontally, not pointing, not rotating.

Across the state line in neighboring New Hampshire this stop signal—extended hand and arm—becomes the *left turn* signal. The *right turn* is the same as in Massachusetts, but to *stop* or *slow down* the hand and arm slants downward as it does in most other states.

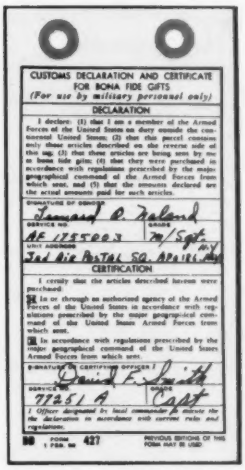
Mississippi, Kansas, and Delaware highway patrol officers will tell you that the proper signal for a *right turn* within their states is a sweeping motion from the rear to the front with the arm extended skyward. Otherwise conventional signals, i.e.; horizontal for a *left turn,* slanted downward for *slow* or *stop,* are used. Nevada brings out the gambling instinct. There a driver just sticks out his left arm to give notice that he is going to change direction. You place your bet then wait until he turns to learn which way and who wins. Gambling is illegal in Pennsylvania and Michigan but like Nevada, a horizontal left arm signals all maneuvers.

Duty-free Entry of *Bona Fide* Gifts



UNITED STATES OF AMERICA
PARCEL POST
CUSTOMS DECLARATION

QUANTITY	ITEMIZED LIST OF CONTENTS	VALUE $	Cents
1	MUSIC BOX	5	95
1	COIN PURSE	2	95
		8	90



CUSTOMS DECLARATION AND CERTIFICATE
FOR BONA FIDE GIFTS
(For use by military personnel only)

DECLARATION

I declare: (1) that I am a member of the Armed Forces of the United States on duty outside the continental United States; (2) that this parcel contains only those articles described on the reverse side of this tag; (3) that these articles are being sent by me as bona fide gifts; (4) that they were purchased in accordance with regulations prescribed by the major geographical command of the Armed Forces from which sent, and (5) that the amounts declared are the actual amounts paid for such articles.

SIGNATURE OF DONOR: Tamara O. Poland
SERVICE NO. AF 17550073 GRADE 2c/Sgt
UNIT ASSIGNED 3rd Air Postal Sq. APO 181, NY

CERTIFICATION

I certify that the articles described hereon were purchased:

[X] In or through an authorized agency of the Armed Forces of the United States in accordance with regulations prescribed by the major geographical command of the United States Armed Forces from which sent.

[X] In accordance with regulations prescribed by the major geographical command of the United States Armed Forces from which sent.

SIGNATURE OF CERTIFYING OFFICER: David E. Smith
SERVICE NO. 77251 A GRADE Capt

1 Officer designated by local commander to execute the the declaration in accordance with current rules and regulations.

DD FORM 1 FEB. 48 427 PREVIOUS EDITIONS OF THIS FORM MAY BE USED

CONTINUATION of the mailing privilege that permits members of the Armed Forces to send *bona fide* gifts of less than $50 value duty free to the U. S. (*Public Law 790) depends on how well individual mailers adhere to the law, Lt. Col. James K. Adcock, Director of the Army and Air Force Postal Service, reminded USAF personnel recently.

"The law," explains Colonel Adcock, "was enacted as a morale measure for servicemen overseas and is temporary in nature. Abuse of the privilege by even a few people may result in its loss to all members of the Air Force as well as to members of the other services. That's why it's incumbent upon every member of the Air Force to insure that the duty-free mailing privilege is not abused."

These are the important points to remember:

As long as an item purchased abroad is a *bona fide* gift and its value doesn't exceed $50 Air Force personnel may mail it to the U. S. free of customs duty. The value of the gift is determined by U. S. customs appraisers and is not necessarily the purchase price paid by the donor. In applicable instances, the amount determined to be in excess of $50 in value will be dutiable regardless of purchase price.

Air Force personnel stationed overseas *may not* ship as *bona fide* gifts, merchandise to stateside friends and relatives for safekeeping or future use.

Those stationed abroad *may not* use DD Form 427 (Customs Declaration and Certificate) for mailing merchandise as gifts to friends and relatives who actually order or pay for the articles themselves.

Air Force exchanges *may not* ship mail order merchandise to purchasers in the U. S. with a fraudulent DD Form 427 attached.

American and foreign civilians and commercial shippers *may not* use the duty-free gift privilege to gain free customs entry.

Air Force personnel *may not* use a DD Form 427 to mail articles back to the U. S. while visiting an overseas area on leave status.

To insure that the duty-free gift privilege is not abused, Air Force commanders overseas are required to periodically review the rules that permit mailing of such gifts; compare current directives and actual procedures; limit the number of officers designated to sign the DD Form 427; insure that postal clerks know the current application of the law; and advise personnel that a false statement can result in a military courts martial for military personnel and Federal trial for civilians.

"The majority of our Air Force people obey the customs law," Colonel Adcock points out, "however there are a few cases where airmen stationed overseas do abuse the duty-free privilege. In many cases these violations are due to ignorance of the law. Since compliance with the customs laws is entirely the responsibility of the individual mailer, it's important that Air Force personnel stationed abroad know the regulations."

If you're stationed overseas and sending home a *bona fide* gift you *must* attach the proper declaration form obtainable at your unit of assignment or at your post office.

To send a gift not exceeding $10 in value duty free it must have POD Form 2966 attached. This form requires only your signature; no certification is required but the parcel itself must be indorsed *"bona fide* gift, value not exceeding $10."

To send gifts of up to $50 in value duty free you *must* attach a signed Customs Declaration and Certificate (DD Form 427) with certification by an officer. It is perfectly legal to send home gifts of more than $50 in value provided you declare full value of the article. The declared value over $50 is liable to customs assessment.

If members of the Air Force serving overseas are to continue to enjoy this privilege it is up to each individual to strictly observe the customs laws regarding duty-free entry of gifts. If you have any question about the proper mailing procedure regarding *bona fide* gifts, consult your local Air Force postal officer.

*On July 17, this year, the President signed Public Law 99—86th Congress, which extends the provisions of Public Law 790 until 3 July 1961.

USAF INSTRUCTORS

IN ancient times a warrior could promote himself by slaying his supervisor with a sword. This "best qualified" promotion system resulted in a high personnel turnover rate and perpetuated the task of training replacements. Military supervisors were charged with teaching swordsmanship to the recruits in their charge. Since every swordsman was a threat to his supervisor's life, much of the instruction was given in a half-hearted manner.

Then came the bow and arrow, which permitted recruits to compete for promotions on an archery range instead of in an arena. The military mortality rate dropped and supervisors began taking their teaching responsibilities more seriously.

Time passed. Crossbows, muskets, rifles, machineguns, and airplanes were introduced. Each new weapon placed new responsibilities on the shoulders of instructors. Eventually it became advisable to appoint certain highly qualified personnel to full-time teaching.

The United States entered World War I with only 65 officers and 1,100 enlisted men assigned to aviation duties. Training bases were hurriedly built and many highly competent men who wanted frontline air combat duty were kept in the States as full-time instructors. Some of the chosen pilots and mechanics screamed so loud they could be heard above the roar of their airplane engines. They argued that they were being assigned to duties of secondary importance. Actually their contribution to victory was great. Theirs was a major role in building a 200,000-man Army Air Service by the end of the war. U. S. airpower has depended directly upon full-time instructors ever since; through the lean years following World War I, through World War II, in the face of a Berlin blockade, Communist military aggression in Korea, and the transition from piston-engine airplanes to jets and guided missiles. Now that we are entering the space age we must rely to a greater extent than ever before on Air Force instructors.

Air Training Command, USAF's largest employer of instructors, is more insistent than ever that their people be thoroughly qualified in the subjects they will teach, have extensive field experience, and successfully complete an instructor training course.

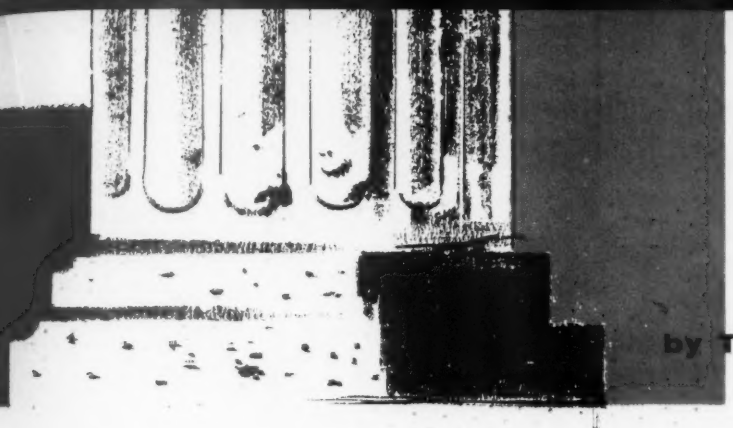
Most military and technical instructors now assigned are NCOs. Many are recent overseas returnees who were recommended by overseas commanders on the basis of their technical and leadership skills and their ability to impart their technical and military knowledge to subordinates. Some of the military instructors at the basic training center are former technicians who retrained into the education field when their technical specialties became surplus to Air Force requirements.

Unfortunately there are seldom enough volunteers who meet the established high standards. Training officials must therefore settle for as many qualified volunteers as possible, fill in the gaps with capable nonvolunteers, and hope that the latter group will learn to like the teaching profession. Many of them do.

If you are an outstanding NCO, the type generally rated as "best qualified" when promotion recommendations are prepared, you may one day be called upon to serve as an Air Training Command instructor. Because most supervisors conduct on-the-job training programs, and therefore have some teaching experience already, the transition from line supervisor to classroom teacher is not as difficult as one might expect.

Upon arrival at a training base, or shortly thereafter, a potential instructor is enrolled in an intense, practical eight-week course designed specifically to teach him how to teach. This how-to-do-it course has proved so effective that a number of colleges and universities are in the process of establishing similar programs for their faculties and for senior college students who will enter the teaching profession.

Men who are to become military instructors at basic training centers get their formal training at Lackland AFB, Tex. In addition to the basic eight-week course



by TSgt. Harold L. Craven
The Airman Staff

S--foundation of American Airpower

they are required to complete several hours of military subjects, including flight and squadron drill, voice of command, ceremonies, and inspections. They are then awarded shoulder boards denoting their status as tactical instructors.

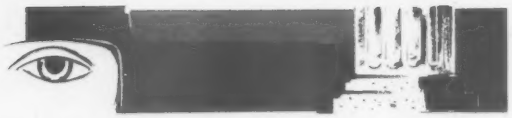
At one time it was common practice to select tactical instructors from graduating basic training flights. Airmen selected served as assistant tactical instructors for a brief period, then received training flights of their own.

The present policy of using specially-trained NCO instructors with years of Air Force experience enables students to get accurate answers to their questions.

Training for technical school instructors is conducted at the various Air Training Command technical school installations. One of these is Chanute AFB, Ill., which offers approximately 100 different technical courses in more than a dozen airman career fields. There a staff of 25 military and civilian educators operates an instructor training program that turns out approximately 1,000 graduates annually. Fifteen of the 25 faculty members of the instructor training branch have masters degrees or higher and a number have currently valid state teachers certificates. All of them have years of experience in the education field.

A noncommissioned officer sent to Chanute to serve as a technical instructor completes the initial eight-week instructor course as an *instructor-trainee*. When he starts teaching, he is awarded a distinctive instructor badge and upgraded to the status of *instructor*. Later he can become a *key instructor*, then an *instructor-supervisor*. A *key instructor* is one capable of conducting classes in all weeks or instructional units of his phase, block, or subject. An *instructor-supervisor*, in addition to being capable of supervising the work of other teaching personnel, must be able to teach any segment or day of instruction under his supervision.

To qualify for advancement, instructors attend special courses such as the supervisor's course, offered on a two hours per day basis over a six weeks period, and a 45-hour counselor training program. Several other courses are taught, including public speaking, reading improvement, training literature writing, educational measurement practices, written test construction, performance test construction, vocabulary development and word usage, school administration, educational psychology, grading practices, on-the-job training, and the Airman Career Program. When new or modified equipment is to be included in a course qualified instructors may attend a factory training course to prepare for the new material. The life of an Air Force



technical instructor is one of constant self-improvement.

Instructors are no less vulnerable for foreign service duty than other Air Force people. There is no established stateside duty tour for them and they are subject to all the assignment regulations and policies affecting technicians on the flightline. Because most technical instructors have previous field experience as well as highly developed leadership and teaching abilities they are usually welcome additions to any operational squadron's personnel roster. As a matter of fact the Air Force has a program whereby overseas commanders review overseas returnees prior to their departure from the unit to determine their potential as instructors for Air Training Command.

Promotionwise, technical instructors are considered equally with operational personnel. This was not always the case. Some years ago instructor promotions were about as scare as whales in sardine cans, and the memory of this situation lingers on, discouraging many qualified personnel who might otherwise volunteer to teach.

Television Training

Instructor training programs at other Air Training Command bases are similar to those at Chanute. Lowry AFB, Colo., which has pioneered in the use of technical training television, also provides on-the-job training in television teaching and lesson script preparation for instructors assigned to the Department of Bomber Training (see *Venio, Video, Vinco,* THE AIRMAN, August 1959). Plans are underway to expand television as a teaching medium, so it is probable that technical instructors at other Air Training Command bases will eventually be able to learn TV teaching skills.

There was a time, shortly before the invention of the airplane, when members of the teaching profession were not too well regarded by their contemporaries. In 1889, for example, Oscar Wilde wrote, in *The Decay of Lying,* "Everybody who is incapable of learning has taken to teaching." His judgment appears to have been somewhat harsh, for the students of that era managed to bring about more scientific and technical wonders in the next few decades than had been achieved by men in the previous thousands of centuries.

Because of these wonders there is a greater need for teacher competence now than there was in Oscar Wilde's time. This is as true in the military services as it is in civilian fields of endeavor. Today's Air Force instructors, recognized by contemporaries as the foundation of American airpower, are probably the best qualified teachers in military history. Because Air Training Command is conducting an active instructor training program, tomorrow they will be better still.

NO SECRETS HERE

TSgt. Maxson

by SSgt. Irvin H. Lee
337th Fighter Group (AD)

AIR FORCE supervisors looking for new ways to conduct on-the-job training programs would do well to adopt the ideas of TSgt. Dewey Maxson of ADC's 337th Fighter Group, Portland International Airport, Oreg.

As NCOIC of the Consolidated Aircraft Maintenance Squadron's electric shop, Sergeant Maxson has developed numerous OJT aids for the 15 airmen in his charge.

But that's not why the name Dewey Maxson has become a training legend on the flightline and throughout the base. What's his secret? He doesn't have any—secrets, that is. Or as he puts it "Don't withhold necessary information from the men under you."

"Max" has established a veritable storehouse of trade secrets in a "What to Do" file devoted to all electronic functions of the base's F-102As. Recorded on each 5 x 8 inch card is the step-by-step procedure for repairing any known malfunction. "This way," he says, "any of our airmen can repair even the most intricate malfunctioning part merely by checking the card devoted to that trouble."

Every time someone runs into a new problem, Max records the solution and places it in a second file. This one, clearly labeled "Trade Secrets," is instantly available to all shop employees.

Sergeant Maxson recalls the years from 1945 to 1949 when, as an apprentice automotive electrician, his progress was slowed by supervisors who would only tell him so much about certain phases of the job. "They had their 'trade secrets' about repairing certain parts," he explains, "and I just couldn't learn everything that was necessary to allow me to advance."

Frustrated and disappointed, he decided that should he ever become a supervisor, his men would never find grounds for similar complaints against him.

Today, fellow airmen point the finger of credit to Max when they are complimented on excellent morale and superior work production.

Records maintained in the shop show that of the 25 airmen trainees under Maxson's supervision since December, 1952, all averaged 85 percent on test scores and progressed from the three to five level in record time. One airman worked under Max for a period of four years, and in less than 36 months, advanced from apprentice to seven level.

pre-flight

SPRINGBOARD to WINGS

Hq. Air Training Command

WHEN an aviation cadet recruit arrives at Lackland AFB, Tex., to begin 12 weeks of preflight training he is unceremoniously told he's a pledge, a green-horn, a youngster who is wet behind the ears, and barely knows his name.

Then he is handed a "green tuxedo" (Air Force coveralls), receives 10 pounds of texts and manuals, gets a close-cropped haircut, and is ordered to tuck in his chin, stand tall, and "shape up."

Thus began training for Charles William Hines, a 25-year-old University of California graduate and former Marine drill instructor who recently joined the Air Force.

Recruits like Hines arrive at Lackland not knowing what to expect. They have passed rigid physical and mental examinations. But this is only the beginning of their training.

Almost immediately new cadets are assigned "white gloves"—upperclassmen who practice their leadership qualities on the fledglings. From upperclassmen cadets learn to take orders, are indoctri-

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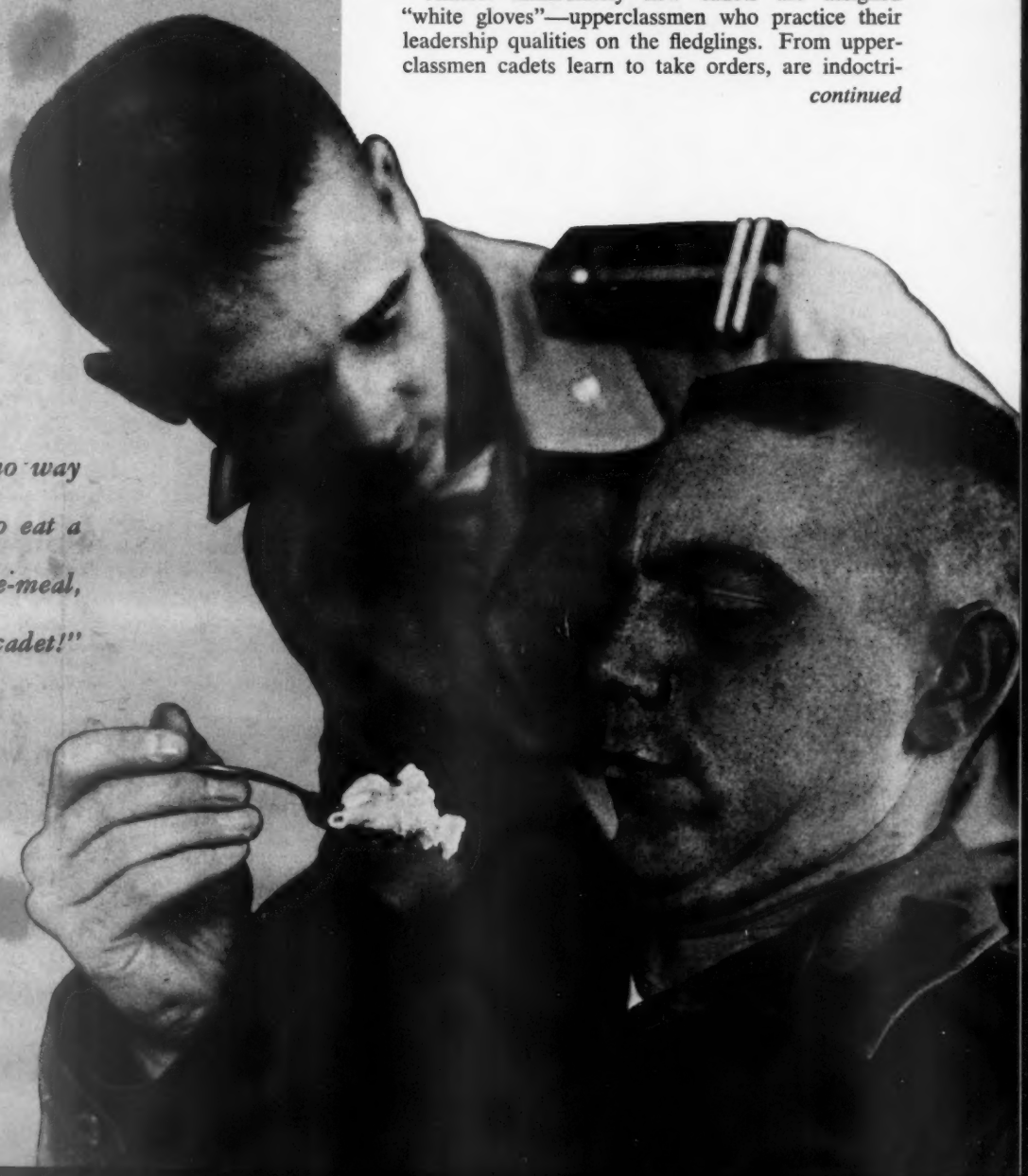


"That's no way to eat a square-meal, cadet!"

First classroom sessions are uncomfortable because of rigid military discipline required of cadet recruits.

Training includes indoctrination in jet ejection seat. Cadet releases armrest, is hurtled along track 40 feet.

continued

nated on cadet tradition. This class system of military instruction is a trademark of cadet preflight since its beginning in 1941 under the Army Air Force.

Under this system recruits like Hines live downstairs in barracks while upperclassmen live on the second floor. Commissioned training officers supervise upperclassmen who instruct the newcomers in military bearing and courtesy. At all times the training officers chart the growth of both groups.

Finally, after a lowerclassman's initial six weeks of training, upperclassmen graduate and go to pilot and navigator schools. Now, the once-new cadets themselves become upperclassmen; begin giving sharp, terse orders.

Aviation cadets at Lackland receive 79 hours of drill. Half of this time is spent in learning military customs and courtesies and practicing parades.

MOST cadets in the Air Training Command's pre-flight program are 18- to 21-years-old and have had some college training. More than 20 percent of each new class are former enlisted personnel.

During their 12 weeks' course cadets spend 104 hours in class. Another 277 hours are devoted to military skills—drill, ceremonies, and inspection.

Meanwhile, cadets are trained to perform under extreme mental strain. Later, as commissioned officers, this will help them coolly solve difficult problems.

Neatness and honor, among other things, are emphasized at pre-flight training. There is a place for everything and everything has its place. Cadets can look in a dormitory closet and tell in an instant if anything is out of place. As pilots someday they will be able to glance at an instrument panel and say, "That gauge isn't working right."

Everything cadets say is the honest-to-God truth. Their word is

Public speaking is practiced by Cadet Hines. To aid speaking habits, class critiques talks.

"Grab your ankles, rock 40 times, screaming the count out loud." Future fliers receive rigid physical training.

PHOTOS BY A/1C ROLAND HILTSCHER AND MSGT. DABNEY RAYFIELD

never questioned. A cadet honor system guides their conduct.

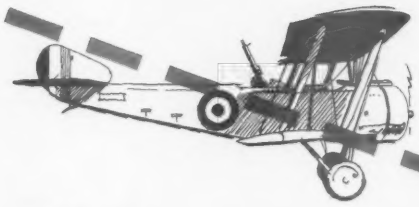
Once pre-flight training is completed cadets have from eight to 18 months of specialized training ahead. Over 125,000 young men have graduated. Today's cadets, however, still endeavor to outshine their predecessors. Their pre-flight training has not made them finished products, but as conditioned individuals they have keen awareness of the responsibilities that await them as Air Force flying officers.

Evenings are the time to talk; about the newest Air Force jet aircraft, the flying school that comes after pre-flight.

Six weeks of an aviation cadet's training he takes stern orders; the second six weeks he gives them.

FLYING REGS

MCMXX



Those Fabric, Crate, and Baling Wire Flying Machines Flew Safely— providing you followed the rules.

BY THE BOOK

(CIRCA 1920)

Shortly after WW I flying regulations were left, for the most part, to the discretion of Air Service station commanders. As a result, some unorthodox flying took place.

By 1920 it became apparent to Air Service officials that something had to be done to curb some pilots' aerial antics. Over-the-field loops, take-off rolls, and other stunts weren't conducive to good flying safety records.

For this reason a list of flying regulations was published to cover all Air Service flying activities. These rules were general in scope, but nevertheless helped keep pilots from bumping into mountains and otherwise falling out of the sky.

Titled "General Rules to be followed at all U. S. Flying Fields," the 75 regulations established uniform flying procedures. Listed here are some of them, from the Jan. 2, 1920 *Air Service Newsletter*. THE AIRMAN thinks they may be of some use to today's pilots, just as they were valuable to yesterday's iron men in wooden ships.

—1st Lt. BRIAN SHEEHAN, *Airman Staff*

1. Don't take the machine into the air unless you are satisfied it will fly.
2. Never leave the ground with the motor leaking.
3. Don't turn sharply when taxiing. Instead of turning short, have someone lift the tail around.
4. In taking off, look at the ground and the air.
5. Never get out of a machine with the motor running until the pilot relieving you can reach the engine controls.
6. Pilots should carry hankies in a handy position to wipe off goggles.
7. Riding on the steps, wings, or tail of a machine is prohibited.
8. In case the engine fails on takeoff land straight ahead regardless of obstacles.
9. No machine must taxi faster than a man can walk.
10. Do not trust altitude instruments.
11. Learn to gauge altitude, especially on landing.
12. If you see another machine near you get out of its way.
13. No two cadets should ever ride together in the same machine.
14. Never run motor so that blast will blow on other machines.
15. Before you begin a landing glide see that no machines are under you.
16. Hedge-hopping will not be tolerated.
17. No spins on back or tail slides will be indulged in as they unnecessarily strain the machine.
18. If flying against the wind, and you wish to turn and fly with the wind, don't make a sharp turn near the ground. You might crash.
19. Motors have been known to stop during a long glide. If pilot wishes to use motor for landing he should open throttle.
20. Don't attempt to force machines onto the ground with more than flying speed. The result is bouncing and ricocheting.
21. Aviators will not wear spurs while flying.
22. Do not use aeronautical gasoline in cars and motorcycles.
23. You must not take off or land closer than 50 feet to the hangar.
24. Never take a machine into the air until you are familiar with its controls and instruments.
25. If an emergency occurs while flying, land as soon as you can.
26. It is advisable to carry a good pair of cutting pliers in a position where both pilot and passenger can reach them in case of an accident.
27. Joy rides will not be given to civilians.

THE SHAPE of THINGS TO COME

by

Lt. Gen. Bernard A. Schriever

COMMANDER, ARDC

OCTOBER ushers in the third year of the Space Age. For most people this new epoch is still vested in glamor, with more than a touch of fantasy about it. Imaginations are hypnotized by what already has happened and the intriguing portents of what the future may hold.

While the popular mind is caught by the high drama of events, as if these lacked precedent, the Air Force sees in the present period of dynamic evolution a logical carry-on of a familiar pattern. Each increase in altitudes, speeds, and ranges of its equipment achieved over the past half century has marked a steady advance toward the fringes of space where man now gropes adventurously.

That being the case, it is natural that we in the Air Force are vitally concerned personally, professionally, and strategically with the shape of things to come.

As we enter the third year of the challenging new era, there are cogent reasons for taking a searching look at what we can discern in order to evaluate our current position and to make tentative estimate as to where we can reasonably expect to be in another decade or so.

Any attempt to forecast even the major probabilities over such a span of time is admittedly a speculative business because scientific and technological achievements have a habit of confounding both the optimist and the pessimist. To borrow an apt line from one of the Epistles: "Now we see as through a glass, darkly . . ."

With that thought in mind, let us consider such matters as the military usefulness of space, the future role of the airplane, and the transition of Air Force systems to keep the peace. It is also well to examine the enormously formidable problems we now confront, with an acute awareness of how much depends on their speedy solutions.

The Uses of Space

Spirited discussion centers on the probable military utility of space and this debate is certain to be protracted. There are sharp differences of opinion on the subject among very sincere and dedicated men, both in uniform and in civilian scientific circles. Never has there been a broader physical field for argument.

I might observe this clashing of views has been oft duplicated in the past whenever new horizons have beckoned or man has found himself facing the challenge of frontiers beyond which stretch unknown expanses and the intimidating shadows of dire hazard.

In the main, present contention centers on what space may offer for strategic and active defense operations. Vehement pros and cons are being exchanged, too, over more remote matters such as the military value of lunar or even planetary bases. Meanwhile, first things first.

Already general agreement exists on certain specifics. No one questions that surface-to-surface, long-range ballistic missiles provided the propulsive systems which opened the Space Age and simultaneously heralded an era of weapons with awesome capabilities.

It is likewise beginning to be recognized that a versatile satellite family can effectively serve a number of military purposes in support capacities. These include

communications, weather information, navigational aids, patrol, photo reconnaissance, and early warning of attack. Equally important in value are scientific research devices which not only will give us more precise geodetic information about our own planet and its forces but also will educate us about phenomena in spatial environment, a medium where our knowledge is still so limited.

Of course, we have had the first data-compiling vehicles in service for some time now and they will be

presently followed by more improved types with increased instrumentation. Given continued priority, other members of this unmanned satellite family will begin to expand both the scientific and military coverage this year and next. More sophisticated units are under development and involve the availability of more powerful propulsion systems.

I am satisfied we will have the propulsion requirements solved in good time. There appears little doubt that chemical propellants will be our mainstay over the next several years. A few months ago we scored a major breakthrough with the production of a new rocket fuel—liquid hydrogen refrigerated to a temperature close to absolute zero. This has made possible an increase in engine thrust of almost 40 percent and may well prove to be our ultimate chemical propellant.

Higher energy propulsion systems, of course, are indispensable for boosting larger payloads. They also give us a capability of putting a satellite in an orbit where it will deliver optimum performance. This propellant-flight plan relationship has important aspects to be treated later.

For unmanned vehicles the whole outlook is most encouraging, as I appraise it, and the flow of dividends from their operations can be expected to mount steadily henceforth. By the very nature of the data the various satellite types are intended to acquire, pure sciences as well as civilian interests stand to benefit as much as military applications. An excellent example of this is the *Explorer VI* satellite launched in August. I will have more to say about this satellite later in this article.

Manned Space Systems

The Air Force's objective is firmly defined. It is to exploit to the utmost whatever can be learned from the rapid advance of the space sciences and their technologies which will enable us to discharge our assigned mission with maximum effectiveness in the future.

Space already has had a terrific impact on long accepted doctrines of military strategy. This is only the beginning. We in the Air Force, like other responsible leaders, are fully cognizant of the implications with reference to our defense posture. A direct, immediate and vital concern is how best to adapt that posture to what lies ahead.

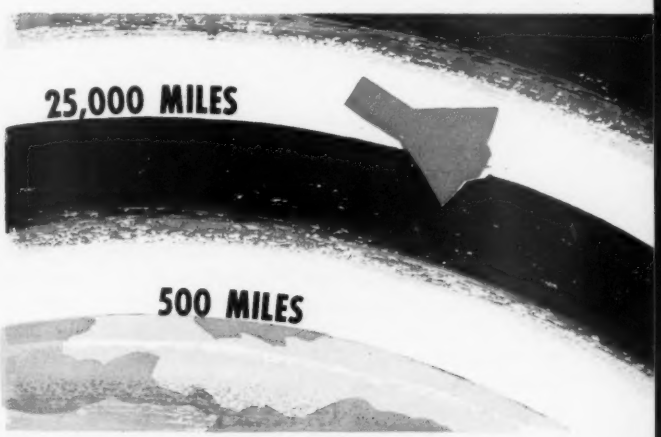
The potentialities of robot military vehicles are already predictable. It is an article of faith with me that wherever such vehicles can be sent in cislunar space, manned spacecraft are certain to follow. Here, at present, we peer through a glass so dark as to make for the dimmest vision.

What will be the appearance of these operational vehicles, the character of their weapon systems? To what degree may their capabilities be limited by natural forces and phenomena in the immediate cosmos?

These are a few of the multiple questions now under intensive study. No one can yet pretend to predict what all the answers may prove to be, but those answers will be found and, indeed, some are even now starting to emerge.

In my considered opinion we should begin to get our first real insight about the solutions as unmanned satellites provide definitive information about the space environment from 500 to 25,000 miles above our planet. For well into the future, I think, this zone is the most likely operational theater for manned spacecraft.

Considering the mind-numbing distances of our Solar System, I appreciate that the extent of the suggested theater seems cramped and unspectacular. Indeed, as a scientific precisionist might remind us, this is not even all true space because the thinning, outermost layer of



atmosphere stretches beyond the altitude of 500 miles.

There are sound reasons, however, for planning in terms of the theater proposed. After all, our mission is to safeguard the security of a terrestrial nation. The chief threat to this security reposes in another terrestrial source. Our preoccupation is the Earth and the maintenance of a superiority necessary to deter any hostile flight against the Free World either in the uppermost atmosphere or the adjoining reaches of cislunar space.

Implicit in any consideration of how far *should* we go is the vital matter of logistic support. Clearly we will be dependent on Earth bases for that and so logistics may well be the tether which will limit the range of regular missions for some decades to come.

Superiority Goal

In the initial military operations zone I believe deterrent superiority will be a matter of maneuverable spacecraft, packing the strongest punch.

Superiority is a word I use advisedly for future astronautical operations. I would define it as the ability to exert military dominance in any given area or areas of space as our mission may dictate.

In our enthusiasm over sending vehicles beyond the Earth's atmospheric envelope we have spoken somewhat injudiciously on occasion of "conquest" and "control." Purists remind me that "conquest," by definition, is either a completed action or a campaign directed toward that end of vanquishing or subjugation. Likewise when the word, control, is applied without qualification the implication is across-the-board.

Last year there appeared in THE AIRMAN an article*

* See *The 65 Zero Question*, THE AIRMAN, June 1958.

on the amount of cosmic space which can be explored optically by the world's largest telescope. The figure, in cubic miles, works out to 65 followed by 65 zeros. There is no word in our language for a sum of that magnitude. Yet the universe extends dizzying distances beyond this visually observable realm of space. Radio telescopes are probing more distant reaches, and may shortly be multiplying that 65 zero number by as much as 19 times.

I cannot possibly conceive of any "conquest" by man of such an enormously vast region, even reckoning in terms of centuries. And I vehemently question that he will ever be able to "control" it all. In my analysis, he will gradually succeed in making use of an infinitesimal portion of all this outer space for advantageous military, civilian, and scientific operations. His "control" will be limited to this portion and hence be a question of the localized superiority he can bring to bear within its confines.

In giving the 500-25,000 mile zone as the first likely operational strata for manned spacecraft, I do not intend to suggest that Air Force interest would end there. On the contrary, we have a definite interest in exploration far beyond that region. We want to accumulate information about the Moon, many unknown characteristics of the nearer planets, as well as the various natural force fields and other phenomena which may exist in such distant environments.

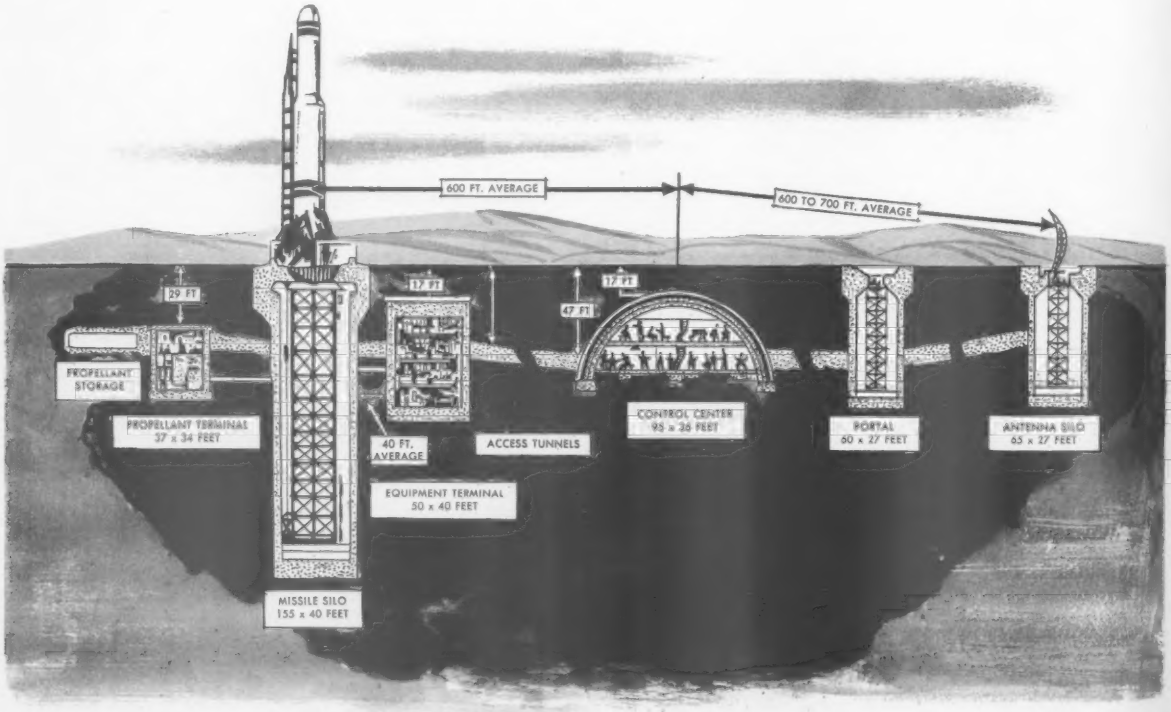
A goodly portion of these data we expect to acquire in the course of Air Force experimental missile firings. More will accrue from such missions we are commissioned to perform for the National Astronautics and Space Administration, the civilian agency charged primarily with the investigation of space for scientific and other peaceful purposes.

The Air Force has a long and proud tradition of enthusiastic participation in scientific enterprises initiated by educational and other civilian instrumentalities for the primary purposes of expanding mankind's knowledge.

I am confident that coming special missions in space for NASA will add further luster to that fine tradition.

By investigating the nature and phenomena of space at more distant altitudes, there is no question we will learn things which make for a better understanding of conditions prevailing in the initial zone of systematic operations. We know that by exploring atmospheric altitudes greater than those regularly used by operational aircraft at various times in the past, we developed information of important value in dealing with communications and weather problems, as well as utilization of the jet stream and so forth.

Moreover by this scientific reconnaissance of more distant space regions, we would be forearming ourselves factually on what to expect and prepare for in

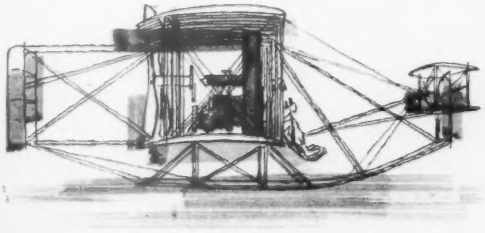


the event it becomes advisable at some later date to deploy military vehicles at altitudes in excess of 25,000 miles.

The Plane and the "Mix"

Amid all the endless speculation touched off by the advent of the Space Age one concern has been predominant with airmen. What does it portend for the Air Force in terms of equipment and personnel?

In our strategic role the first evidences of major changes are already manifest. Operational ballistic missiles squadrons are being teamed with SAC's manned aircraft to give the command a greater operational flexibility and versatility. The ratio of IRBMs and ICBMs to combat aircraft will steadily increase. By 1970, for example, SAC probably will be relying more heavily on missile squadrons than on manned intercontinental bombers for deterrent capabilities.



Even so, aircraft developments will continue for the foreseeable future. As the next decade lengthens we look to the success of the Dynasoar development experiment to give the inventory a manned strategic vehicle operable in the sensible atmosphere and perhaps to the borderline of true space.

To turn now to a broader operational category—ADC, TAC, etc. Between missiles and space devices the look here will be markedly changed 10 years hence. Interim generations of fighters and interceptors will span much of the gap. The upcoming family of missiles, however, should be able to supply much of the tactical support which manned aircraft provided in the past. I expect to see the development of sophisticated defense weaponry and with it new techniques for protection against aggressive attacks. Unmanned satellites will take over many of the support missions now carried out by manned aircraft in the various special classifications mentioned earlier.

What about MATS? In all likelihood it will be the least affected by the changing picture for quite a while to come. As missile bases multiply in the ZI and overseas, the powered aircraft of MATS appear the most reliable and economical means of handling priority logistics. When our fixed bases are supplemented by mobile units, continually redeploying to deny the enemy a "fix" on their location, the role of MATS assumes heightened importance.

It should be possible within the next several years to deliver very small groups of personnel by a rocket-carrier to soft landings in other continents within a few minutes. The transport system to do this, however, would be prohibitively expensive for the work performed. Taking the longer view, I can conceive the day when rocket-carriers will be practicable for moving sizeable numbers of passengers or quantities of cargo at a moderate cost under certain conditions, but that day won't be soon.

Even so, I do not and cannot imagine the Air Force virtually without planes a decade hence, with exclusive reliance on a "mix" of missiles and manned spacecraft to carry out its major missions.

First a backward glance at this "mix" business; we've had it with us virtually from the start. Fifty years ago this month the first military pilot soloed in the first plane purchased for the country's air arm. The mix then: One plane and a couple of balloons. Now the invention of the balloon is usually assigned to the year 1783. Compared with powered flight, it may have seemed headed for obsolescence in 1909. What happened?

We had the balloon still in the "mix" during the first World War and since. It was the balloon which enabled the Air Force to get off to a headstart in probing the zone of partial space flight equivalence when the historic flights of *Explorer I* and *II* yielded such a rich fund of scientific data in the mid '30s. And the balloon continues to render us valuable service in such projects as the *Manhigh* ascents, begun in 1957,

which increase our store of knowledge about specific conditions in areas of space flight equivalence and how man reacts to them.

So balloons are still being used and some scientists of note believe this old aeronautical system is destined to stay with us quite a while longer. We know, for instance, that potential space flight candidates who have emerged creditably from ground simulator tests have shown far different physical and psychological reactions in balloon flight to extreme altitude where isolation, stresses, and environment are something like the real thing. Eventually spacecraft trainers will come along but as of today the space medicine evidence available suggests that high balloon ascents may be the best method for a reliable final screening of personnel scheduled for graduation to such training vehicles.

To return to aircraft, I repeat that I cannot foresee the future USAF stripped of all planes, certainly not in the next decade or so. While a substantial inventory reduction appears inevitable I am far from persuaded that planes serving military purposes are destined to become as rare as the surrey with the fringe on top.

As far as combat types are concerned, there are imponderables in the picture. Many of our current ideas on the operational usefulness of space environment are necessarily theoretical. A definitive evaluation cannot be made until we have accumulated a lot of experience in that medium. Civilian scientists expect space observation and research in their various fields will bring quite a few surprises. We may be surprised, too, and have to reevaluate our tentative existing concepts.

Suppose, for instance, that early warning methods can be perfected which would give a defense system sufficient time for mounting such effective action against a maximum range ICBM attack that it could be largely blunted. We do not have this capability today, but assuming it could come about in time, there is the possibility that the best way to exploit surprise with minimum warning in a retaliatory strike-back would be an airborne missile launch by a plane taking highly deceptive action hundreds of miles from the programmed target. We must remember that the missile art is in its infancy and there is no telling what sophisticated varieties may eventually evolve.

Then there is the question of so-called brushfire conflicts. It is unlikely that a missile can be developed which in a highly fluid situation can discriminate and select the most profitable targets of opportunity. No assortment of black boxes imaginable will have the analytical skills and resourcefulness of the trained human mind. It would follow then that for certain type missions the human component would be indispensable.

Or take the practical matter of training the space crews of tomorrow. In the selection of the astronauts for Project Mercury one of the premium qualifications was that the men be experienced pilots with at least

some time in jets. This was a sound requirement and I believe it will remain so.

Any manned space mission will begin and should end in the lower atmosphere. In the present state of the art, it is true that any control of a vehicle by its occupant will be minimal both at launch and return. As more sophisticated systems evolve, we hope to exert increasing control particularly over reentry, once the sensible layers of the atmosphere are reached. A pilot cannot handle a spacecraft skillfully in this phase of a mission without a thorough grounding in aerodynamics plus adequate experience in atmospheric flight. An astronaut can acquire that know-how only through previous training in high performance aircraft so we may well conclude that future prespace training programs will include provisions for this essential instruction.

Other continuing uses suggest themselves. For example, we can't dispense with search and rescue units because there will be data cones to be retrieved and space crews to be located in event of unprogrammed landings in remote areas. Aircraft likewise will still be needed for administrative and liaison use, as well as for the emergency help the Air Force has been rendering at times of civil disasters.

Problems Formidable

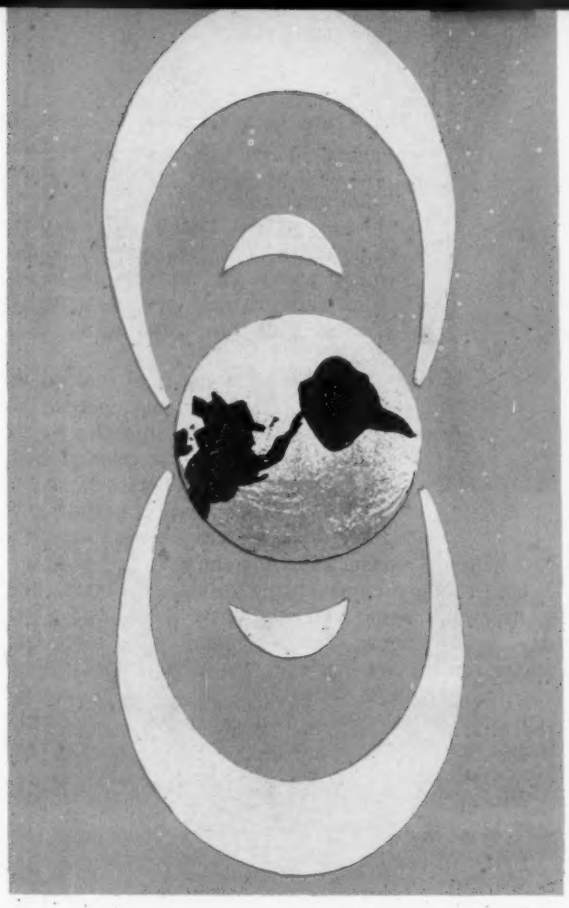
Much as I am encouraged by the foundation research and development (R&D) has brought into being, the progress made possible to date, and the promise of numerous projects now in the planning or study stages, I cannot profess to be satisfied. Anyone charged with my particular mission, as I conceive it, has to be impatient with the status quo, always striving for better results.

I submit that fact was never truer than it is today when the matter of national survival depends on the capabilities we have *in-being*—at a given minute, hour, or day. One occasionally hears discussions of what "degree" of deterrent power we can afford to maintain. In my book deterrence is either positive or you don't possess it at all. And the avowed enemy of record must be left with no doubts that it is positive.

In saying that I am always less than satisfied, I do not mean to leave the impression that my applause will be anything like half-hearted for each new breakthrough. Naturally I shall be gratified at each new advance, whether in basic knowledge or in completed hardware but I'll be inwardly regretful that the knowledge did not become available sooner and that the hardware wasn't somewhat better.

The explanation for this attitude is that I am constantly beset by the thought of time. By the very nature of its work, R&D must utilize a combination of human talents, equipment, materials, facilities, and installations, all making for an extremely costly outlay. But by far the most expensive commodity with which we deal is time.

A fresh gain in scientific or technological knowledge registered next month, would have enhanced the capabilities of a system just put into production. Of course we could incorporate it in a later model, but modifications take time and that is the part of the bill we can least afford at this critical pass in history.



Twin belts of intensely hot radiation girdling the globe were a discovery of a Thor-launched 72,000-mile probe in October, 1958. Another Thor-launched paddlewheel satellite is now making the first systematic investigation of the belts which are believed to leave open "escape hatches" at the poles.

To recite and discuss all the problems we are grappling with would require a lengthy book. I will have to content myself here with some remarks on the three most difficult.

Propulsion: Upon the development of increasingly more efficient, high-energy propulsion systems depends the realization of the optimum space capabilities which our program envisions. Hence the priority which attaches to R&D projects in this field.

It is clear that more powerful motors are essential for larger payloads as well as deeper penetration of space, but that is not all the story.

Only with greater velocity at our command can we select the desired flight pattern or travel the staggering distances which space conditions impose.

There is a tendency to think of speeds in the order of 18,000 miles per hour to orbit a vehicle, or something over 24,000 m.p.h. to get to the Moon, or about 25,500 m.p.h. to place a device in an ellipse averaging 10,000 miles above the surface of Venus. With each of these projects a certain elapsed time has come to be associated.

Let me point out here that all the velocities cited are the minima required. Furthermore, in each case the assumption is that the celestial body in question will be in its most favorable position with respect to the Earth. Finally, the velocities given restrict the vehicles to the simplest trajectories.

Under these minimal energy formulae the transit time to the Moon would be in the order of two and a half days and to Venus, about 150 days. With more than minumum velocity available, the transit time to these objectives could be reduced or we would possess the capability of attempting launches when the celestial bodies were in positions more distant than at their most favorable approach to our planet.

With artificial Earth satellites, too, a greater freedom in programming orbital trajectories is most desirable.

We had a dramatic advance demonstration of that in August when a *Thor-Able* system boosted the *Explorer VI* into the elongated orbit necessary to start providing us with a systematic, long-term flow of data on the exact nature of the two hot layers of radiation girding the Earth in bands of 1,400-to-3,400 miles, and from 8,000-to-12,000 miles out in space.

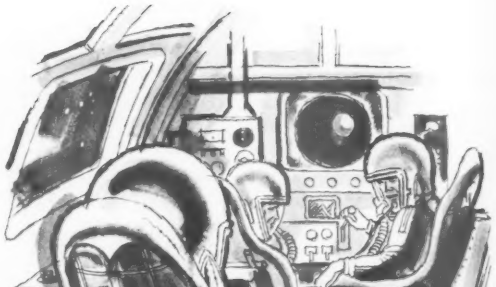
The success of this paddlewheel pathfinder required an orbit that swung out to more than 26,000 miles, or approximately 10 times the greatest apogee height previously obtained by any other vehicle. Yet at its low point the orbit had to arc within 156.6 miles of the Earth in order to investigate the theory that some of the high-energy particles from the inner radiation band may "drip" down through lesser altitudes. While the radiation check was the prime purpose of the mission, the *Explorer VI* was instrumented to produce a variety of other information.

All major components of this *Thor-Able* exploratory vehicle were developed by the Air Force and their dramatic performance speaks volumes for the tempo at which we are moving.

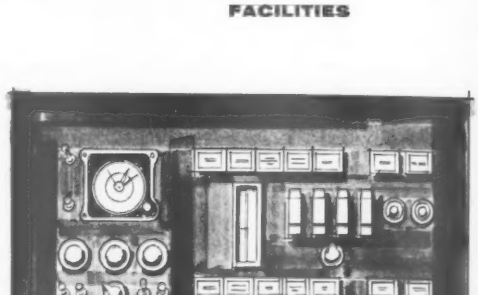
While the orbit now being transited by the *Explorer VI* represents an important milestone, we know that we must have the capabilities to place devices in precise ellipses of far greater eccentricity as more sophisticated second generation missions are scheduled.

This question of more powerful propulsion systems has another aspect which is frequently overlooked. It pertains to space distances in a different way and also to future military operations in that medium.

Space vehicles cannot attain straight-line flight. Their



FACILITIES



CONTROLS

PROPULSION

courses are subject to the same physical laws of motion which govern the movements of all natural celestial bodies. Hence all flight is along a trajectory path and the number of possible trajectories is theoretically infinite.

A while back I referred to a Moon mission. This affords us a graphic example of what trajectory flight involves in terms of the great extra mileage to be traversed. Let us assume the Moon happens to be at its average distance from our planet, a matter of almost 240,000 miles. However, that is the familiar line-of-sight distance we were accustomed to use for measuring in the pre-Space Age. To reach the Moon at its average distance a vehicle, following the simplest trajectory and utilizing the minimum propellant energy, would travel in the order of 580,000 miles on its outbound trip. If the device orbited the Moon once and whipped back to the Earth, the flight log would be well over a million miles when the vehicle reentered our sensible atmosphere.

When manned spacecraft become available for regular missions, propulsion systems will have to be designed and ready to meet the demands for greater distances inherent in all trajectory flight.

Future systems also must have longer lives since the duration of space missions will steadily lengthen just as they have with powered aircraft since Kitty Hawk.

The performance of propellants is rated by the specific impulse they produce—that is the amount of thrust, computed in pound-seconds delivered by the consumption of a pound of a given propellant. To make this more understandable to the uninitiated, the fuels used when postwar experiments began with the V-2 had a specific impulse of 200; in other words, this rocket got one pound of thrust out of each pound of propellant over an operating period of 200 seconds.

Chemical propellants subsequently developed and since in use have had specific impulses ranging from 200 to something over 250. The present range is in the 250-350 plus bracket. To look at two other possible propulsion systems, nuclear engines have a potential of from 400 to 3,000 and ions from 800 to 300,000. While the outlook is auspicious for harnessing some of the energy of these extremely great power sources, a tremendous amount of work remains to be done before we can break through to advanced types of such engines and have them available for practical flight application.

Controls: The usefulness of future space vehicles will depend on the amount of control which can be exercised over them. I have three objectives in mind here.

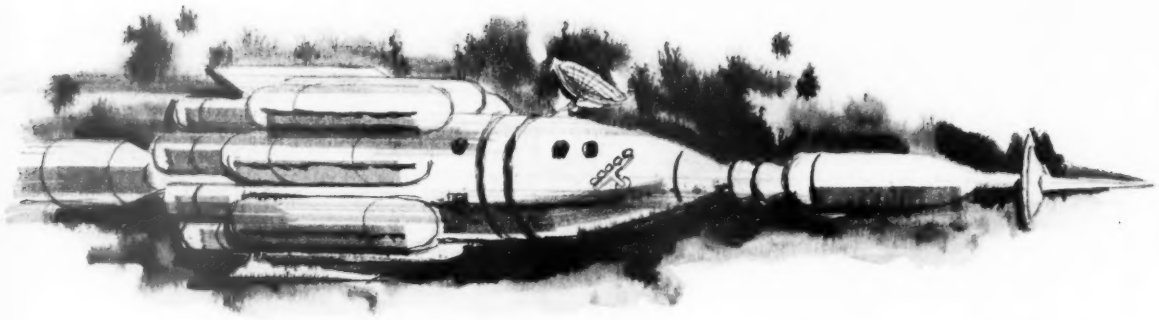
The first is the development of a system which would enable us to direct the return of an instrumented payload to a soft terrestrial landing. Initial development work on these devices is now being carried out by the Air Force with the *Discoverer* series satellites which are being launched from Vandenberg Air Force Base, Calif.

The recovery of these expensive devices virtually undamaged would make possible their reuse at least in some cases with new instrumentation or other modification, thereby making for operational economies. A study of space environment effects on the structural

materials and payloads of the vehicle could yield information valuable in the design and construction of subsequent types.

The second is a system or subsystems to compensate for any disturbance in the programmed orbit or trajectory of a vehicle. There exists throughout the Solar System an interplay of gravitational attractions which from time to time causes irregularities in the normal motions of the planets, their natural satellites, and other celestial bodies. This interplay also affects space vehicles. Certain automated satellites now projected must be kept in programmed courses for maximum yield. As of today a remote control ground system appears the most reliable means for correcting aberrations in their flight. With manned vehicles the necessary adjustments would be through crew-operated control equipment.

The third is the controls complex necessary to give spacecraft maneuverability—that prime asset in military operations since time immemorial. It goes without saying that some maneuverability will be essential to negotiate reentry but of greater concern is the capacity for operational movement during the entire course of a mission.



Maneuvering in space will call for mastering new techniques. A change in a vehicle's position becomes a matter of transferring from one trajectory pattern to another. This is not a matter of sharp 180-degree turns or steep climbs approaching the vertical. It is a sidling, jockeying operation of swinging from one type ellipse to another. The necessary thrust required must be gauged to a fine nicety; a bit too much and you're out of the ballpark you intended to reach; a shade too little and you're short of getting in. Whether it be too much or too little, it is to the detriment of fuel economy because second attempts mean the expenditure of more propellants, a very precious commodity if one is out in space.

A controls system to deliver exactly what it takes will have to be an extremely sophisticated one. Before a spacecraft seeks a different altitude to investigate, say, an unidentified object, two problems in celestial mechanics are involved. One is a precise check on the flight path the spacecraft is following and its relative position with regard to the unidentified object. Then the ellipse pattern of that object has to be computed accurately. These data determine the amount of acceleration or deceleration to be applied.

Crew facilities: The compelling reason for putting men into space is to utilize their unique faculties and abilities. If they are to use their special skills and talent to a high degree, we must provide them with working and living accommodations conducive to good performance.

Let us be mindful that space missions will extend from days into weeks, then eventually many months. The men will be operating under stresses which invariably go with pioneering in a new medium, at once unnatural and inimical. They will be deprived of most of the normal sensory stimuli which makes everyday life a variegated experience, however much we are inclined to take that for granted. Their prospective diet is hardly a gourmet's delight. The opportunities for relaxing diversion seem meager at the moment.

Our objective is a personnel system which would ease far more than now conceivable the understandably difficult matter of physiological and psychological adjustment. It would embody a means for producing artificial gravitation not only to eliminate the abnormal condition of weightlessness but also to permit a reasonable freedom of motion. An environment which keeps personnel virtually immobilized throughout a protracted mission isn't going to make for substantial returns from the valuable human components, nor are the men going to know much personal satisfaction in meager productivity.

The best of our space environment simulator cabins in use today fall far short of the suitable systems we seek. It won't be many years hence before we'll be looking on them as semi-primitive contrivances. And, frankly, extraordinary progress must be registered in this developmental field if we are to hasten that day.

The Eloquent Record

Not long ago I picked up a book and was idly flicking its pages until three words jumped up from the print and hit me in the eye. They were: "the outer world."

Another article on this new Space Age? Far from it. The expression, I found, evidently came into being shortly after that celebrated voyage of Christopher Columbus in 1492. It was the way that at least some of contemporary Western Europe used to refer to his discovery—the Western Hemisphere.

In today's context this old description sounds quaint and narrow. As we know, Western Europe soon was given indisputable reasons for changing its initial concept as to where Columbus and those who followed had been. This was no "outer world" but an extension —and a vast one—of the same world wherein the older countries dwelt.

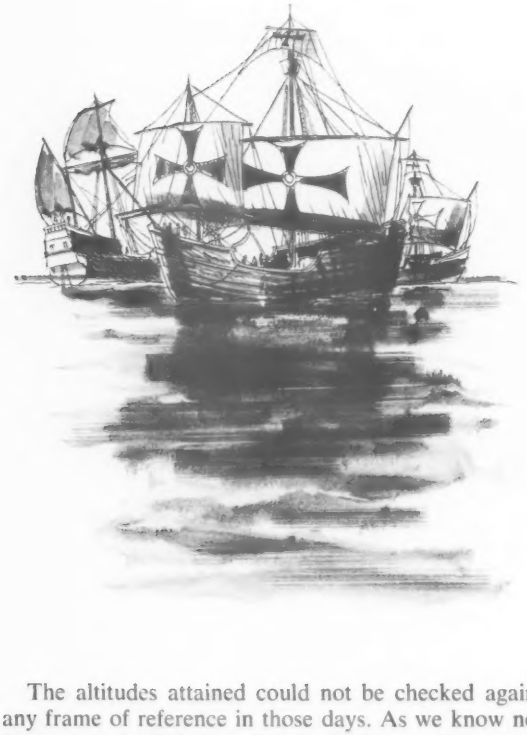
I think this little historical footnote may help highlight Air Force thinking on the subject of extraterrestrial space. From the beginning our mission has been in the vertical dimension. When the first primitive aircraft of struts and canvas were flying at altitudes dangerously low by present standards, we were not talking of upper air strata in terms of "outer atmosphere," as if it were a remote, detached realm, very much as the Old World once considered the New. To us, it was always considered an inevitable extension of then current operational zones.

There would come a time, we reasoned, when missions would have to go higher, higher, and still higher. Often we may not have been too sure how science and technology would make this possible, or even how soon. But the philosophy always held there was no time like

the present to learn as much as possible about the new environments we were likely to enter or to concentrate on puzzling over the mechanical means to get us there. So the men who built the Air Force kept doing just that over the years, and the record bears me out. The fringes of space and beyond represent just another extension of our vertical dimension.

In the early decades the questing upward was slow and unspectacular but it followed a pattern. A quarter of a century ago, our highest flying bomber, the new B-10, could go to 28,000 feet and in those days that was reckoned a big bit of space between any plane and terra firma.

The year 1934 saw the *Explorer I* stratosphere balloon flight carry three of our pilots to an altitude of 60,613 feet in a pressurized gondola jammed with research instrumentation. The next year in *Explorer II* a crew of two achieved 72,394 feet.*

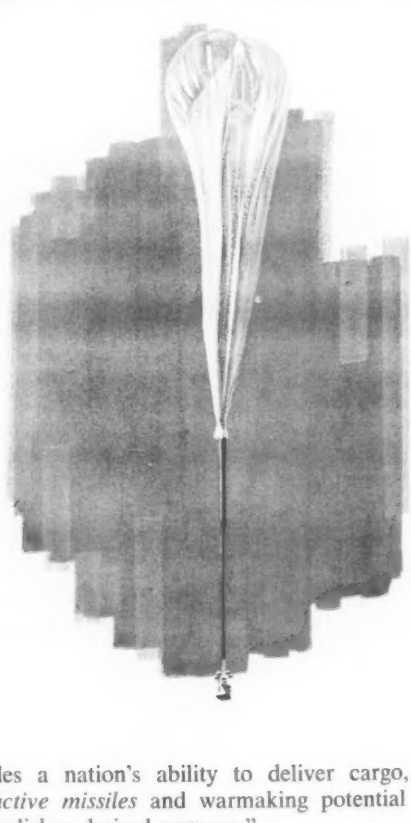


The altitudes attained could not be checked against any frame of reference in those days. As we know now from space medicine studies the flights carried the two crews into the zone of partial space flight equivalence where most but not all conditions are found which exist in the nearest regions of space.

Inspired is a tepid word to describe the vision that planned the research program the stratoflights carried out. The results yielded invaluable dividends for high altitude operations in WW II and in other ways. As so often happens with the results of a broad research program, we didn't and couldn't realize how much we acquired when the flights ended. When the prospects for manned space flight became a definite possibility, the technical papers on the two missions took on a wholly new importance. Col. David Simons of *Manhigh* fame remarked, "These were all we had to go by, yet they covered practically the full range of important basic concepts we needed."

Before the end of WW II the Air Force had begun to apply guided missile techniques to existing equipment, including high-angle bombs, glide bombs, torpedoes, and remotely controlled "war weary" aircraft. In March, 1945, two months before the Nazis surrendered, a long-term missiles research program was initiated by the Air Force for the development of advanced types of weapons with the maximum range and punch.

In his report to the Secretary of War not long after V-J Day, Gen. H. H. Arnold dwelt on "Air Power and the Future" and laid down this guideline: "Air Power includes a nation's ability to deliver cargo, people, *destructive missiles* and warmaking potential . . . to accomplish a desired purpose."



His successor as Air Force Chief of Staff, Gen. Carl Spaatz, dwelt at some length on our missiles requirements and program in his report of 1948, the year he retired. It had been determined much earlier, he wrote, "that special emphasis should be given to the development of a supersonic, surface-to-surface missile

* See *It's A Grand Old Name*, THE AIRMAN, July & August, 1958.

capable of carrying an atomic warhead 5,000 miles."

Meanwhile, what was being done? Our first testing facility was activated at Wendover AFB in Utah on V-J Day for evaluation of captured and experimental rocket systems.

By 1946 we had a study in hand on the feasibility of artificial satellites. Research was going forward on the problems of ballistic guidance systems, reentry, and propellants. Industrial studies had been initiated looking to the development of large liquid-fueled rocket engines.

This broad program was pushed assiduously the next few years, with test firings of experimental missiles adding to our background knowledge. A B-29 "flying laboratory" shuttled back and forth over a 4,800-mile course to test the effects of cosmic rays on possible component materials for use in guided missiles, as well as to compile more data on this high energy radiation. Air Force interest in this phenomenon was hardly new; cosmic ray studies began with the two stratoflights back in the '30s.

In 1949 we were convinced that a long-range ballistics missile system was practicable, but there was a rub. The weapon system we then visualized would not have had the capability of delivering an atomic warhead the 5,000 miles specified by General Spaatz. Atomic warheads then available would have required 500 tons of hardware to get them on targets that distant.

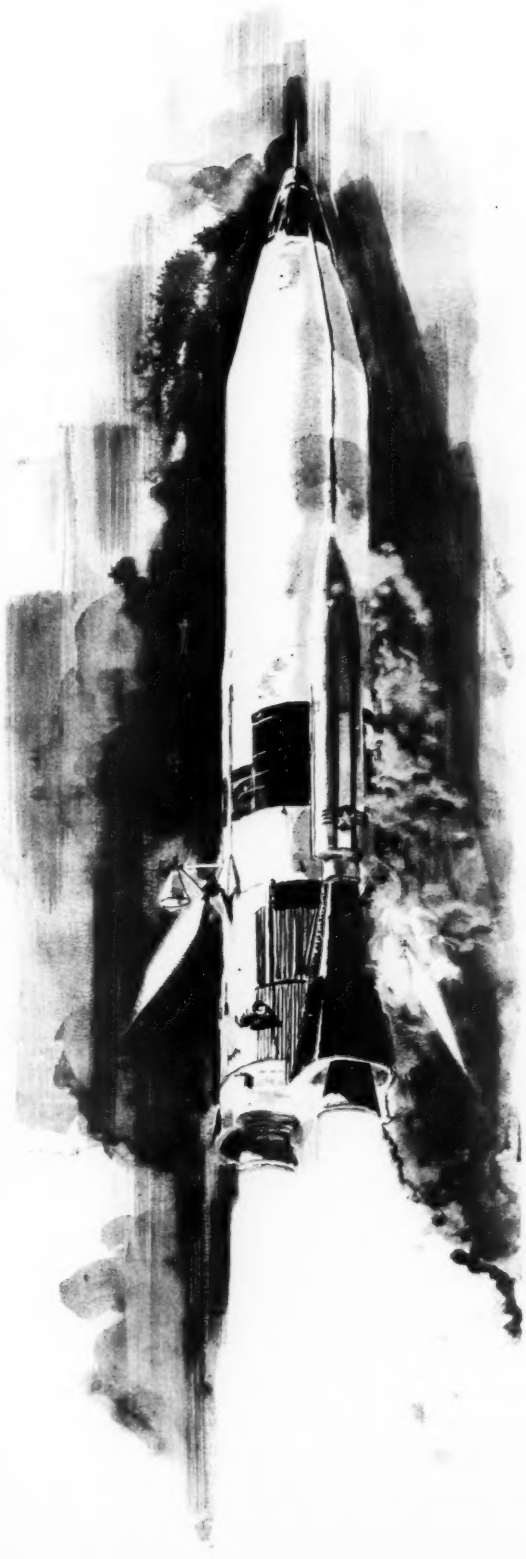
Further research and experiment the following year served to reinforce our conclusions about a practicable type ICBM and in January, 1951, a contract was made with Convair for the preliminary design work on the *Atlas*. The step was a calculated risk for the hardware could only accommodate a warhead of moderate size.

Breakthrough and Momentum

Then came the thermonuclear breakthrough of '52-'53. At first this existed only in physicists' papers. Tests in the Pacific tended to advance the original theoretical data to the realm of distinct probability. Yet it was not until the spring of '54 that actual firings demonstrated the hydrogen bomb was a reality. Even then the thermonuclear devices used were so big it would have taken a gigantic vehicle to deliver them. But—and again only on paper—it appeared probable that a much smaller and lighter warhead, with a substantial megaton yield, could be devised in the years ahead.

Immediately after the recommendations of the Von Neumann Committee in '54 the *Atlas* program was given the highest Air Force priority and the Western Development Command, now AFBMD, was established in California with complete authority and responsibility for this ICBM weapons system. The target was to have the engine, airframe, nose cone, guidance, and all of the missile's ground support systems ready by the time the smaller warheads began to become available.

Attaining a target is not merely the delivery of a missile. It involves a multitude of other things which may not make for exciting reading. Long range planning for experimental and operational facilities took on special urgency. An elaborate program for testing had to be



worked out. There was the question of personnel and their training, as well as how to bring missile squadrons along so that they would be highly competent when the weapon systems deliveries began.

In '55 the scope of BMD's activities widened. Development of the *Titan* was approved to serve as an alternate ICBM. Previous research and study of an intermediate range missile culminated with approval to proceed with the *Thor*. The following year saw a succession of test runs with *Atlas* components and the activation of what is now Vandenberg AFB as the country's first training and operational facility for ICBMs and IRBMs.

Come 1957 we fired the *Thor* on a successful maiden flight a month before the first Sputnik swung into orbit. Before the year ended it saw other successful launches of this IRBM. One of these shots travelled 2,400 miles or 60% farther than the missile's designed range of 1,500 miles. Months earlier in June, test firings of the *Atlas* began.

There was another immensely significant event. By July we had completed an 18-month test firing series which demonstrated for the first time that reentry of a cone device was possible. This was contrary to the general belief of many at the series start that it would be virtually impossible to produce a device which could successfully withstand the terrible heat and shock of hypersonic reentry of the atmosphere at maximum ICBM ranges.

How quickly the basic reentry design data was applied is best evidenced by the fact that '58 witnessed the first successful ICBM-range reentry, with a *Thor-Able* travelling the full distance route and impacting an assigned target area. Another capability proved was the recovery of the first data capsule returned from space, showing that it was physically possible to retrieve such instrumented in-flight data. Meanwhile we got the go-ahead on the *Minuteman* solid propellant system program.

I believe the four basic systems—*Thor, Atlas, Titan* and *Minuteman*—make a very effective and versatile family with considerable growth possibilities. I estimate that the useful life of the first three will extend through the next decade, quite a span when one reflects on the speedy obsolescence of modern weapons. The *Minuteman* will enjoy greater longevity.

Since our missiles program accelerated sharply in 1954 we have come a long way. Previously we had next to nothing in the way of a base. Today we possess a development, testing, and industrial foundation well conceived and far broader than the average taxpayer is aware. The missile represents only 20 percent of the complete weapons system. The other 80 percent is on the ground.

This is a vast complex of men and equipment. It includes the personnel who man our missile centers, the launch pads, gantry cranes, blockhouses, tracking equipment, maintenance and supply elements. It extends to the large array of testing facilities so essential for assessing the performance reliability of individual components, subsystems, and whole missile systems upon delivery by the manufacturers. Finally it embraces the unique science-industry-military team and the impressive number of prime contractors and subcontractors who are not only tooled up to handle current orders but are also striving to anticipate by research the needs which could materialize tomorrow or the day after.

In terms of monetary outlay alone, I would say the structure today represents an investment of more than $700 million, of which approximately $130 million should be credited to industry's contributions. But any dollar price tag cannot disclose the great value of experience accumulated in management relations and the concurrency approach to rocketry problems which shortens lead time. Nor will it indicate the great worth of the special talents and skills assembled in the basic support team consisting of more than 90,000 people, of whom some 18,000 are scientists and engineers. Finally it must omit any estimate on the readiness factor in the many thousands of enterprises across the country which are our primary and secondary manufacturing back-up or other class supply and support sources. Virtually every state is represented in this roster.

Fortunately for the Nation, this solid foundation exists and is being enlarged. It is disturbing to meditate on what our situation might be had this most significant undertaking gone forward with less urgency or less vision.

New Assignments

While our foremost concern in creating missile systems has been, quite understandably their military potential in safeguarding the national security, we could readily see their usefulness for the peaceful purposes of science.

This awareness is a matter of record in a public statement I made 32 months ago. These were my words on February 19, 1957:

"I would be willing to venture a guess that 90 percent of the unmanned follow-on (space) projects one could visualize for the future can be undertaken with propulsion, guidance, and structural techniques presently under development in the Air Force Ballistic Missile Program."

Most of the space projects undertaken since or now underway embody base facilities, know-how, components, or whole missile systems developed by the Air Force.

Current programs and those scheduled for the future both by DOD and NASA speak for continuing heavy reliance on Air Force experience and hardware.

Let me in a brief rundown indicate some other examples of follow-on vehicle systems under development for the coming phases of space research and exploration purposes.

NASA has disclosed what additions to the family of propulsion systems it considers indispensable for carrying out the purely scientific projects it has mapped for the decade ahead. Of this coming generation, the Air Force is being counted on to provide or develop six of the seven basic systems contemplated.

The first three are scheduled for delivery next year. One is the *Thor-Delta,* a refinement of the *Thor-Able* which incorporates a guidance system to give the vehicle a coasting capability between the burnout of the first stage and the firing of the second so that greater distances can be attained. The others are the *Atlas-Able* and *Atlas-Hustler*, two- and three-stage adaptations of the ICBM which NASA credits with "remarkable" performance growth potential.

The three follow-on systems we are concerned with are the *Vega, Centaur,* and the *Nova,* the latter the largest and most powerful of the planned family, with a six-million-pound thrust.

This recital can give only an inkling of the proportions of the workload we are shouldering in the interests of a program wholly peaceful in its concept and scientific objective. We could not be enlisted in a more noble cause. However, sight should never be lost of the fact that classified military projects increase the magnitude

of our responsibilities. The development of progressively more powerful propulsion systems, of course, will facilitate man's systematic exploration of the wide new yonder but we must remember that the oncoming generation of engines have most significant military applications. If this be the third year of the Space Age, let us also remind ourselves it is the thirteenth year of a cold war.

At this grim pass in our national history deterrence must be maintained at all cost. Our forefathers bought and preserved our freedoms at a great price. We cannot shrink from doing a whit-less to hold that precious heritage. There can be no respites in our drive, no flagging of effort.

The tempo of our progress to date affords not the least grounds for complacency. I want to see it revved up to a point where we'd be meeting the exacting standard "Hap" Arnold set in WW II: "The difficult we do immediately; the impossible takes a little longer."

I repeat this is deadly serious business. We have to put into it everything it takes.

ENTER *AGENA*

When the *Discoverer V* put a cone in transpolar orbit back in August it also resurrected a what's-in-a-name mystery now more than a century old.

Some press accounts of the launch reported variously that for the first time either the entire *Discoverer* system or only the satellite component had been given a special name—*Agena,* "for the star."

Neither is correct. *Agena* was the imaginative name bestowed on a new Lockheed second stage used in the vehicle and the word came from some unsung, creative mind in ARPA.

And who or what is *Agena?* Thereby hangs something of a tale.

To begin with *Agena* is one of the 10 most brilliant stars in the heavens, located in the great constellation of the Centaur. To astronomers it is more familiarly known as Beta Centauri. Distant some 80 light years from our planet, *Agena* is a blue star, the hottest celestial classification, and has a temperature in the order of 36,000 degrees Fahrenheit. It is 229 times as bright as the Sun, a run-of-the-mill yellow star, has a diameter three times greater than the Sun, and is four times denser in composition.

What made *Agena* an appropriate name for a transpolar orbit launch is that this star is located just east of the Southern Cross (*Crux*) which indicates the location of the celestial south pole, the area at which Vandenberg AFB must aim to put a device in longitudinal loops around the globe.

Indeed, *Agena* and a multiple star system known as Alpha Centauri have long been known as the "southern pointers," as well as "guaradians of the cross," because a line projected through their positions will bisect the hypothetical traversing arms suggested by the four star formation of the Southern Cross. Alpha Centauri is of academic interest to space fans because one of its components, Proxima Centauri, is the nearest star in the Milky Way galaxy to the Earth, except for the Sun. Its estimated distance is a mere 4.16 light years which means a matter of only 24,452,480,000,000 miles.

To get back to *Agena,* this star was evidently named by an American, Elijah Burritt, for that designation of Beta Centauri first appears in his *Geography of the Heavens,* published in 1857.

The nomenclature of constellations and stars is rather mixed. Some names, inherited from the Graeco-Roman era, are borrowed from mythology, for example the constellation of the Centaur, named for the half-man, half-horse creature of ancient fable. Other names refer to animals, such as the Big Bear *(Ursa Majoris)* or Little Goat *(Capella).* Still others are named for objects, among them The Scales *(Libra)* and The Lyre *(Lyra).*

Old Elijah Burritt, the man who christened *Agena,* had passed to his astronomical reward when several decades later another astronomer set to work painstakingly on the evolution of star and constellation names. When he came to *Agena,* he was stumped. There was no question that Burritt had in mind the star, Beta Centauri, in the right foreleg of the imaginary outline of a centaur which the distribution of that constellation's stars is supposed to suggest. However, he could find no clue to what significance the name, *Agena,* represented or whence it was derived. And no astronomy sleuth has fared better since.

So it remains a mystery today and maybe that's just as well. It is better that an object of such extraordinary celestial grandeur go by an enigmatic name rather than be known by the lowly tag bygone Chinese astronomers had for this Beta Centauri. They called it *Mah Fuh,* which in English means *Horse's Belly.*

—WILLIAM A. KINNEY

AIRMAN'S WORLD

Briefs from USAF, world wide

Darts in Operation

First of the Convair F-106 *Delta Darts* to be placed into operational service are assigned to the 539th Fighter-Interceptor Squadron at McGuire AFB, N. J.

ADC's newest interceptor, although similar in appearance to the F-102 is, in reality, a completely new aircraft. Most striking exterior design change is the squared-off vertical tail fin.

Additionally, the new aircraft is equipped with the most advanced armament and fire-control system yet produced. Powerplant for the new fighter is a Pratt and Whitney J-75 turbojet with afterburner.

Several additional air defense units are programmed to receive the *Dart* in coming weeks.

Demotion Justified

Elimination, "with prejudice," of sizable numbers of retrainees from training courses has brought a strong recommendation for punitive action up to and including the loss of a stripe.

Hqs USAF has defined the grounds for such action as that over which the trainee has personal control, i.e., improper attitude, continued absences, and inattention in class. Headquarters recommended that the demotion procedure be adopted as standard in the future.

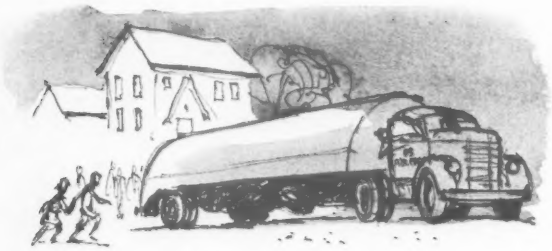
The Wright Move

Air Force and Naval aviation are sharing something in common these days—the Wright brothers, Wilbur and Orville.

While the original Dayton relatives might be slightly overage in grade, the youngsters bearing their illustrious name—but no relationship—are not.

The latest Wright entries into the aviation field are Lt. Wilbur, presently assigned to the 4060th Air Refueling Wing, Dow AFB, Maine; and his brother Lt. (JG) Orville, presently undergoing flight training at Whiting Field, Milton, Fla.

Both are United States Naval Academy graduates, Wilbur in 1958 and Orville in 1956.



Cool, Clear Water

A citizen of Johannesburg, a small California town some 60 miles north of Edwards AFB, recently called the Air Force Flight Test Center with a serious problem—his town was out of water; its only pumping well was dry.

Although producing, a new well, drilled approximately 10 miles away, had not yet been connected to Johannesburg's supply system.

Within a few hours after the plea was received, three Air Force tank-trucks were on their way to the small town carrying 3,500 gallons of water. They unloaded their precious cargo, then began transferring water from the new well into the town's dry lines. Five days later, two additional tankers made a second run to the desert hamlet with 2,500 additional gallons of the now-precious fluid, and repeated the day-long transfer task.

Assistance was repeated as needed until the town completed linking its new well and supply system, thus averting a grave emergency for the desert community.

Desert Wings, Edwards AFB, Calif.

Merry Christmas

The foul-up that can result from misaddressed mail is clearly illustrated by a recent dispatch from Thule AFB, Greenland.

According to the Thule *Times,* some USAF members assigned to that station were still receiving Christmas mail in June. Reasons for the delay were numerous, but the most common was improper return addresses on out-going mail, which correspondents then used as the official address of Thule personnel.

The Base Post Office was flooded with letters addressed to "Thule, Greenland," which is first-class mail. As Greenland belongs to Denmark, all such mail is shipped directly to Copenhagen. During the winter months, Greenland is inaccessible to shipping so the mail must remain in Denmark until surface shipping is resumed in the spring.

Although this is an extreme example, such instances also occur in other overseas areas. Consequently, overseas airmen should take every precaution to assure that correspondents are aware of their correct address.

Junior Spacemen

Many critics of the modern educational system are quick to point out that today's youngsters lack the reading interest of children a generation ago. This criticism is not always justified as officials at the base library, Chanute AFB, Ill., are quick to affirm.

Just prior to the end of the school year last spring, notices were sent to local dependent school children announcing the formation of an Astronauts' Club—a summer book club with a new twist.

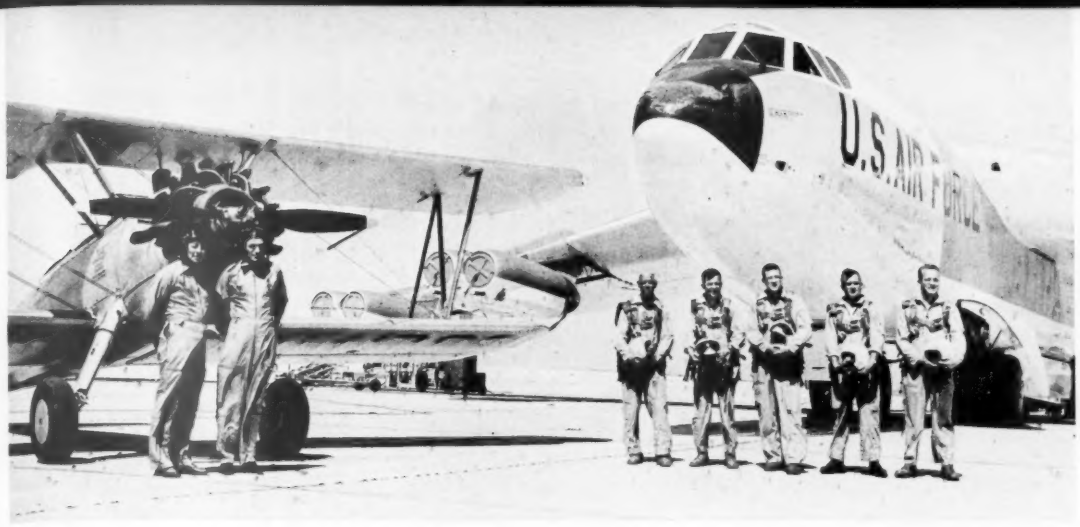
Each child registering with the program had his or her name inscribed on a toy rocket which was placed in the library. In the meantime, a globe was suspended from the ceiling and heavy cord stretched in a rough orbital circle around the dangling world.

When members completed reading five books, their rocket was placed in orbit. For each additional five, they were presented with a nose cone.

Within days after the club was formed, 275 rockets were circling Chanute's junior globe and, before the club had run its course, many of the junior spacemen were boasting collections of seven or more nose cones.

The added library workload was adequately met by pressing several volunteer librarians into service. They too were dependent children—from a slightly older age group—and librarians report that several expressed a definite interest in library work as a future pursuit.

"It's almost like getting two birds with one rocket," says Vivian McLarty, base librarian.



The LAST PT-13D shown here with the latest B-52G has taken its place with dozens of other historical aircraft at the Air Force Museum, Wright-Patterson AFB, Ohio. The fabric-covered *Kaydet* was presented to the Museum by the Boeing Airplane Co. which produced more than 10,000 of the famed WW II primary trainers.

Misawa Must

Officials at Misawa AB, Japan have established a four-hour orientation course which all USAF personnel must attend before they can obtain a driver's license.

The course familiarizes holders of valid stateside permits with Japanese traffic laws, Misawa AB regulations, and general topics of safety.

The Wingspread, Misawa AB, Japan

F-102 FLYING TEST BED. This lightweight, turbojet J-85-5 engine, built by General Electric, is undergoing final airborne test flights at Edwards AFB, Calif. In the 2,000-pound-thrust-class, the engine has been designed to power later models of the USAF T-38 supersonic trainer and Northrop's N-156 *Freedom Fighter*. (See, Airman's World, Sept. '59 issue.) An earlier version of the same engine is being employed in operational models of these aircraft at present.

Needle in a Haystack

Generosity nearly got out of hand for A/3C David Spencer of the 2713th Warehouse Squadron at Tachikawa AB, Japan, recently.

After purchasing a set of rings in anticipation of his forthcoming wedding, Airman Spencer sent the engagement ring to his fiance, Teresa Montano, in Albuquerque, N. Mex. Planning to place the wedding ring in the squadron safe until the arrival of his bride to be, he deposited it temporarily in a suit coat pocket and promptly forgot about it.

Shortly afterward, a call was issued on the base for clothing donations to be distributed to the Izu Peninsula victims of typhoon Ida. Spencer donated the suit which had become his temporary place of safe-keeping.

Several days passed before he discovered the loss and suddenly realized his mistake. With the aid of a Japanese friend who served as interpreter, Spencer rushed to the village of Ohito only to discover the three truckloads of clothing had already been distributed.

Announcements of the search were posted conspicuously throughout the tiny city and an all-day vigil began. About midday, the trousers showed up, but not the coat.

At dinnertime, Spencer and his Japanese friend were invited to dine with Mr. Sugiyama, the local contact man who had been placed in charge of the distribution. Midway through the meal, the group was interrupted by two women bearing some additional items of clothing. Cautiously, the trio made their way through the items—and near the bottom of the pile was the elusive coat.

With heart in mouth, he gingerly reached into the pocket and slowly withdrew the box encasing the ring—precisely where he had placed it more than two weeks earlier.

AIRMAN'S WORLD

Roll Call

WW II alumni of 8th Air Force's 91st Bombardment Group are engaged in a nationwide roundup of men who were stationed at Bassingbourne Air Field, England between 1942 and 1945.

These names and addresses are being sought as a preliminary to arranging a group reunion. Anyone knowing the whereabouts of any member of this organization should write directly to Bassingbourne Rally-Round, c/o Maj. Gen. Stanley T. Wray, P. O. Box 7657, WADC, Wright-Patterson AFB, Ohio.

FLYING PERSONNEL at Otis AFB, Mass., can be assured that their chaplains understand their problems. Two are veteran combat pilots who also share the experience of having been shot down during WW II. Chaplain (Capt.) Milton Allen, left, is thought to be the only chaplain ever to serve in USAF who had previously achieved senior pilot status. In addition, he had also attained the grade of major in the USAF Reserve following his second combat tour during Korea. Chaplain (Capt.) Warren Turner served as a B-17 pilot during WW II. He and his crew were forced to bail out when their *Fortress* was crippled by flak over Bolzano, Italy. Allen and his crew lost a C-46 and had to parachute into the steaming jungles near the China-Burma border in mid-1945.

NO-HANDS LANDING describes the latest USAF version of Boeing's B-47 *Stratojet*. Presently, 12 of the bombers are being converted to "Q" status—drone or pilotless aircraft—and are being tested at Eglin AFB, Fla. When placed in the regular USAF inventory, the QB-47s will be used to simulate long-range bomber missions against this Nation's air defense system. Primary defense agent for these tests will be the *Bomarc* interceptor missile. In the interest of economy, the Bomarc will be programmed to miss the target. The QB-47s will be recovered after each "attack." Proficiency will be measured by means of scoring cameras, mounted in pods beneath the wings of the target aircraft.

Reserved Gathering

More than 250 key members of the Air Force Reserve from all corners of the Nation have returned to their homes following the second annual Chief of Staff's Reserve Forces Seminar held in the Pentagon last week.

Purpose of the two-day gathering was to acquaint these key people with the present position and objectives of the Air Force as a primary military instrument of national defense. They, in turn, are expected to disseminate the information within their organizations.

Secretary of the Air Force James A. Douglas and Chief of Staff Gen. Thomas D. White headed the list of dignitaries who conducted the vital discussions. The agenda covered every possible phase of USAF operations and their significance to the Reserve forces and the Nation.

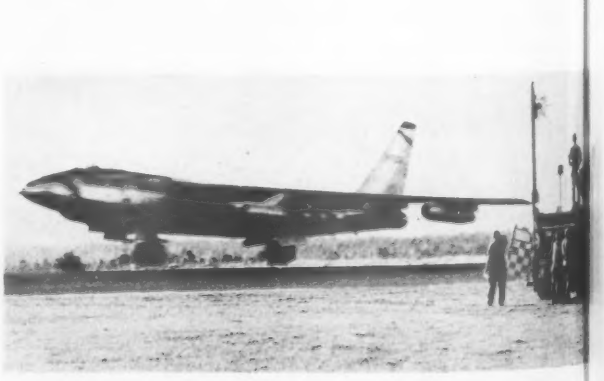
Bits of Blue

. . . Personnel might do well to check the latest revision of AFM 35-10, Service and Dress Uniforms, for information on phase-out of specific uniform items. At the same time, Air Force officials indicate an announcement may be expected during the current month which will signal further uniform changes in coming months.

. . . Chanute AFB, Ill., huge Air Training Command station, has been given the responsibility for the complete training of personnel for two of USAF's latest missiles—the GAM-77 *Hound Dog* and IM-99 *Bomarc*.

. . . SAC's annual bombing and refueling competition gets underway on the 26th of the current month. Bombardment units are staging from McCoy AFB, Fla., and refueling organizations from Homestead AFB, Fla.

. . . According to the latest information, USAF will have acquired all but one of the many Wherry housing projects at Air Force installations by the end of the current fiscal year. Simultaneously, the announcement was made that two additional Capehart projects had been placed under contract—Forbes AFB, Kans., (414 units) and Kincheloe AFB, Mich., (475 units).



SLANTS ON SPACE

/// Here's an intriguing sidelight on space communications. The world's largest radio telescope at Jodrell Bank in the U. K. has been using the Moon as a passive relay in experimental transmissions to the Smithsonian radio observatory near Cambridge, Mass. When Jodrell's big "dish" tried sending selections from Beethoven, Brahms, and Bach via the lunar route the music of the celebrated composers came through with good fidelity to the Smithsonian monitors in the Bay State. It was a different story with attempts at voice transmissions; all that got through to the Massachusetts facility were occasional snatches of "a few feeble words."

Jodrell Bank's huge paraboloid has a diameter of 250 feet. If photographs fail to convey a convincing impression of its size, let airmen be reminded that it dwarfs the familiar dome of the U. S. Capitol, which measures 135 feet, 5 inches in diameter.

/ / /

/// Depending on which scientific authorities you prefer to follow, the outermost zone of the Earth's atmosphere—the exosphere—starts at the altitude of either 500 or 600 miles and stretches onward to interplanetary space. The boundary assigned for the beginning of the exosphere is, of course, an arbitrary approximation. That, too, will be the case whenever science is emboldened by accumulated data to define, for its own purposes, where the exosphere ends and interplanetary space may be said to start.

Why bring up the exosphere? Well, the air or atmosphere is the USAF's medium for operational missions and there are no restrictions on the record as to which atmospheric layer is to be used.

As for this outmost layer, the interesting thing is that of the successful satellites launched by man to date all had perigees at altitudes below the theoretical boundary at which the exosphere starts. Hence technically they don't qualify as true space satellites for some portions of their original orbits were within the scientific limits of the Earth's atmosphere while other portions presumably were not.

If the 600-mile altitude is accepted for the start of the exosphere layer, then two satellites had their entire orbits beneath it in the atmosphere. The first *Sputnik* had a perigee of 142 miles and an apogee of 588 miles. For the shortlived *Discoverer II* orbited last April the figures were: perigee, 142 miles; apogee, 220 miles. By rights, we may refer to them as atmospheric satellites rather than space satellites. This does not mean they are the only two which qualify for the club; we can't be sure on that score until we get an idea on how far out the exosphere is supposed to extend.

A final exosphere note: The layer contains approximately a 10,000 millionth of the total weight of the atmosphere.

Photo courtesy of British Information Services

/ / /

/// Jupiter, largest of the major planets, rotates on its axis the fastest, turning once every 9.9 hours for the shortest "day" in the Solar System.

/ / /

/// Scientists estimate that the fiercely hot core of the Sun has a density some seven times greater than lead. Since the Sun is a gaseous body, this concept of its core being far denser than any known solid substance literally defies human understanding in the present state of learning.

As with the Earth, the component densities vary from surface to center. At the Sun's photosphere, or surface, the density is believed to be below the average for the air of our atmosphere. Midway to the center it becomes about the equivalent of the density of water.

In computing relative densities of heavenly bodies, water is the index of reference. Using this method, the density of the solar core is rated more than 75 times that of water. By contrast, the Earth's density averages about 5.5 times more than water's.

When the total mass of the Sun enters (as it should) into the computation, the mean density of solar material works out to only 1.4 the density of water, making that 5.5 figure for our planet look very substantial.

—WILLIAM A. KINNEY

FISHING IS A WASTE OF TIME!

by TSgt. John K. O'Doherty

IT is well known that baseball enthusiasts are fanatics when it comes to statistics. There isn't a fan worthy of bleacher space who can't spontaneously spew forth such vital information as the total volume of air displaced by Mickey Mantle's bat in the course of a season, and the weight of all dust brushed off home plate at Griffith Stadium since the Senators won the pennant in 1933.

But statistics are very much in vogue in this age which takes its pleasures with deadly seriousness. Thus, the application of a similar system of statistical analysis to the ancient and honorable sport of fishing, discloses startling results in the light of their relationship to the average Air Force fisherman.

A bulletin issued recently by the wildlife conservation people in the office of the Provost Marshal reveals that there are 17,200 acres of fishing water available to Air Force anglers all over the United States. In addition to this, the bulletin says that there are 2,500 miles of streams under Air Force control which are suitable for fishing.

During 1958, many of these lakes and streams were restocked by state and federal agencies as well as by military Rod and Gun Clubs which purchased fingerlings from commercial hatcheries. The restocking program amounted to a total—in round figures—of a million fish. Over and above these worthy efforts in the interest of sport fishing, more than 1,200 acres of fishing water were reclaimed under the Air Force Fish and Wildlife Conservation Program by using rotenone, among other things, to combat the enemies of sport fish.

Now is the time to begin analyzing these interesting figures in terms of what they mean to the individual Air Force fisherman.

There are 8,500 names on the membership rolls of Air Force Rod and Gun Clubs in the zone of interior. But of this number not more than 4,250—or 50 percent—can be classified as practicing fishermen. The others are either exclusively hunters—a separate and somewhat uncultured breed—or are clubhouse sportsmen who sit around the lounge swapping lies about their accomplishments at other bases back in the good old days.

This means, then, that—based on the average width of U. S. streams

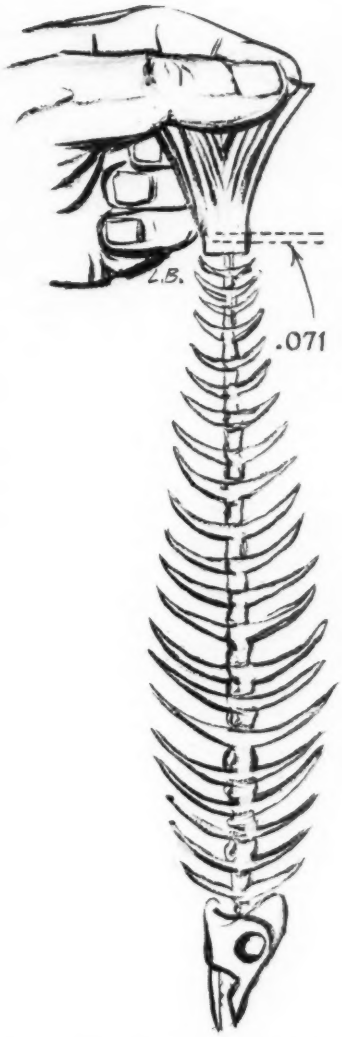
and depth of streams and lakes—there is available to every Air Force fisherman 306.8 acres of water. Sounds impressive, doesn't it?

On the other hand, however, about half the Air Force bases in the United States permit the local citizenry to use their fishing waters, and the other half admits guests, which—in effect—amounts to pretty much the same thing. This cuts down on the available per capita acreage of water considerably. This shrinkage would have little or no inherent importance were it not for a peculiarity common to fishermen everywhere. Everyone wants to fish in the same spot. The bulletin published by the Provost Marshal does not mention the number of hooks hung up on the other fellow's tackle during any given season, and of course there is no record of the volume of profanity incident thereto.

But, to return to the fish. Assuming that the number of Air Force fishermen and the number of civilian-type sportsmen using military waters are about equal, this brings the total roster of working fishermen to 8,500. And assuming that the population of fish living naturally under normal conditions is at least equal to the number added in the annual restocking, the total underwater fish census may be estimated at a conservative two million.

A simple mathematical calculation then reveals that there exists a potential catch of 235.294 fish for each and every angler—military or civilian—using Air Force waters. On the surface it would appear that the odds in favor of the fisherman are terrific, but there are other factors to be considered in due course.

It is now established that each fisherman has available to him 153.4 acres of water and 235.294 fish against which he can match his wits. But even if every fisherman—observing the highest traditions of sportsmanship and fair play—were to restrict himself to his own 153.4 acres, there is no assurance that 235.294 fish will be swimming around under the boat. Some fish are not as good at mathematics as some people; they are inclined to wander about, crossing boundary lines indiscriminately and entire



schools have been known to disregard the laws of statistics completely. There are cases recorded in which the entire 235.294 were reported AWOL from a given area. (A top-flight scientist working on the *Snark* project at Cape Canaveral has worked out a probability curve on this, but his findings are not considered reliable.)

The next important factor to be considered in this study is the conclusion reached by sports writers and other authorities that 90 percent of all fish caught are landed by 10 percent of the fishermen. It is a matter for each individual in communion with his conscience to determine in which category he belongs. The "big ones that got away" may not be counted in attempting to classify oneself in the upper 10 percent.

This disturbing class distinction casts a whole new light on the picture. Paper, pencil, and slide rule reveal that the allotment available to the expert fisherman in the upper 10 percent group is increased from 235.294 fish to 2,117.646 for the same acreage of water. The quota for the duffer, or common variety of average fisherman, shrinks to an appalling 26.143 fish scattered about in 153.4 acres of open water.

At this point, in order to maintain the dignity and serious character of this study, it is appropriate to eliminate the upper 10 percent—the self-styled expert fishermen—from further consideration. It is well known that this group is composed of congenital liars and can contribute nothing to scientific research. Anyone who claims to have caught 2,117.646 fish in a season is obviously untrustworthy and should not be permitted to associate with decent people.

The ordinary, average fisherman is now revealed in a pitiable plight. Chances are he doesn't know the difference between a Royal Coachman and a Colorado Spinner to begin with, and here he is reduced to a niggardly allotment of 26.143 fish with 153.4 acres of water for them to hide in. The favorable odds hinted at in an earlier paragraph are an exploded myth; the true nature of the unequal contest between fish and fisherman is revealed in all its grim, frustrating unfairness.

To make matters worse, even the most ardent fisherman in the Air Force cannot hope to escape from his job to wet a line oftener than once every ten days or so. This circumstance further reduces his chances to 10 percent of what is theoretically possible. He is now down to 2.6143 fish. Now if an airman goes fishing at every possible opportunity, or 36.5 times a year, he can hope to bring home .071 fish each time, if the wind, the tide, the temperature, and barometric pressure are exactly right.

But how does one put .071 fish in the frying pan? The Provost Marshal's bulletin doesn't say anything on this. Might as well toss that bit to the cat.

Somebody's Gotta Go There!

by Col. Edward P. Russell
Warrant Officer and Airmen Assignment Division
DCS/P, Hq USAF

"IT never pays to make plans," said Sergeant Brickdust, snapping the hasp on his footlocker, "until you have the orders in your hand. Here I put in for an assignment in Florida, and what do I get? Windswept Air Base, no less—about as far away from Florida as you can go."

"I know just what you mean," said his buddy. "But I've thought of a way to out-fox 'em. I've always wanted to live in the Southwest, so I'm putting in for the state of Maine."

Anyone who knows the suspense of waiting for an assignment from higher headquarters has either overheard or taken part in a conversation like this. And it cannot be denied that airmen returning from overseas sometimes draw assignments which bear no visible relationship to the places they asked for. But in spite of what happened to Sergeant Brickdust—and others, unfortunately—there is no dark, diabolical plot afoot to send people to South Dakota when they really want to go to New York.

Responsibility for assignment of airmen rests with the Warrant Officer and Airmen Assignment Division which is known as PMP-2 in the Pentagon structure of official abbreviation. This division, under the supervision of Col. L. G. Sidwell, is part of the Directorate of Military Personnel at Hq. USAF. This busy shop, on the top floor of the Pentagon, is only one of more than 20 divisions within the Deputy Chief of Staff for Personnel, but it is of particular interest to individual airmen since it has a finger in the pie of most PCS moves incident to a normal Air Force career.

Col. L. G. Sidwell, director of PMP-2, describes the business of his division as wholesale dealing in personnel. Thousands of people are involved each year to meet the requirements of the "customers," meaning the 18 major air commands at home and overseas plus over a hundred special activities employing Air Force personnel all over the world.

To illustrate the scope of the PMP-2 operation, figures picked from the record show that 149,366 Air Force enlisted personnel were "on the move" during a recent typical six-month period. Now, "on the move" in this sense does not mean that all these people were in travel status or absent from productive assignments at the same time. The figure includes, in addition to those actually in the pipeline, SAC personnel shipping overseas on rotational TDY, persons stationed overseas who have been reported to USAF for rotation, and people in the ZI who have been tagged for a tour of duty abroad.

In some cases the good news had not yet filtered down to the individuals concerned, but it is easy to see why Colonel Sidwell refers to the function of PMP-2 as that of a "wholesaler." The operational commands and other using agencies are the retailers who distribute the people assigned to them to 2,115 operating locations at home and overseas.

Dipping into the record for a look at another interesting figure, we find that PMP-2 must keep track of 651,957 permanent-party manpower spaces authorized for enlisted personnel throughout the Air Force. The

precise number of slots is subject to change as manpower authorization for the Air Force is modified up or down by law. The figure quoted is exact for a particular point in time. Each of these spaces represents someone's assignment. They cover 202 specialties in 42 career fields and include 354 shredouts.

The major air commands submit airmen personnel reports monthly to Headquarters, USAF, indicating numbers of people authorized by AFSC and skill level, their current shortages or overages, and anticipated losses by discharge, retirement, or reassignment for the seventh month in the future. All this information is examined, consolidated, and PMP-2 can tell instantly from a glance at its ledgers exactly how many 3-level chaplain's assistants are serving with AMC and how many air policemen will be needed by SAC before spring. Every AFSC as well as every skill level and shredout has a place in the books.

The mission of the Air Force, in the present arrangement of all the circumstances involved, requires that about 30 percent of the personnel be stationed overseas. This requirement for forces overseas is subject to frequent change for a good many fairly obvious reasons, but 200,000 men is a reasonable round-figure total of Air Force enlisted strength now stationed outside the United States.

In order to maintain this overseas force at the required level and comply with Air Force policies on rotation, PMP-2 must arrange to ship about 75,000 people —another round figure—overseas each year and bring a similar number home for reassignment. The trick to the airman assignment business, then, is to match up the people with the spaces as they are scheduled to be vacated at both ends of the pipeline, without impairing the combat readiness or operational capability of any command.

When airmen are forecast for rotation and reassignment in the ZI the overseas command submits all the necessary information, AFSC, base and area of choice, security clearance, etc., on IBM cards. These cards and the machines which read the perforations are the tools used by PMP-2 in deciding who will go where.

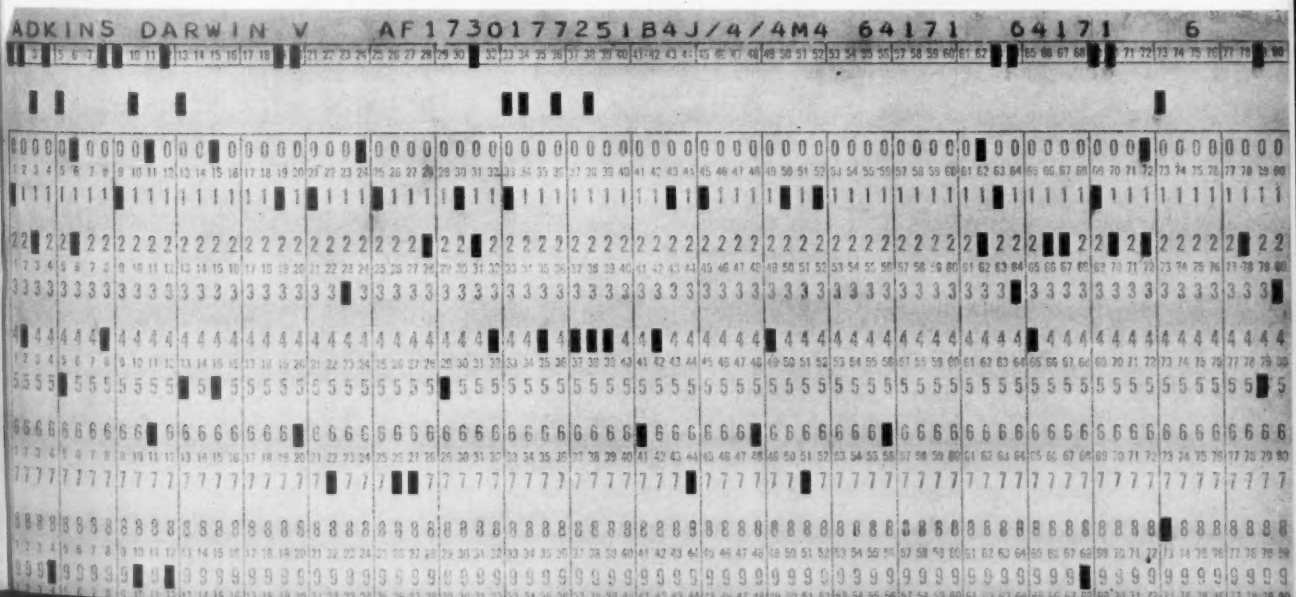
There are three factors to be considered in each case, and every card is handled individually. First—and above all—comes the military requirement; second, the airman's status with respect to isolated duty. There are many stations in the United States which qualify as isolated, and it is Air Force policy not to assign a man to two such locations consecutively. Third consideration is the airman's base of choice, state of choice, and area of choice.

The cards are then run through the IBM machine in an effort to match up military requirements with personal preferences. If a requirement exists for a man's AFSC and skill level at his base of choice, the machine will show it. If the first pass doesn't produce a hit, the card is run again and again, if necessary, against his second choice of base, state of choice, and area of choice. If personal preferences refuse to match up with military requirements all along the line, there is nothing left to do but assign the man to a base where his skill is needed.

Now is the time to look at the results and see how the system works. The figures used are those for the month of August 1959 simply because they happen to be the most recent available at the moment.

The chart shows that 38.2 percent of airmen returnees were assigned to their first area of choice. Twelve percent went to the state selected, and nine percent drew their base of choice. Others won second base of choice or second area of choice. Of the assignments published for this month, two-thirds of all airmen received *some* consideration with respect to personal preferences. *Only one man in every three was arbitrarily assigned by AFSC.* (Sergeant Brickdust, who appeared in the opening paragraph, was one of the unfortunate third men and drew Windswept Air Base instead of Florida.)

Unfortunately, these figures do not prove that two-thirds of the people are completely satisfied, any more than they prove that Sergeant Brickdust is only two-thirds unhappy. Even in his first choice of area, an airman may be several hundred miles away from where he would prefer to be. The people at PMP-2 would like



Col. L. G. Sidwell directs the activities of the Warrant Officer and Airmen Assignment Division at Headquarters, USAF. The division keeps its finger on the pulse of manpower requirements for 18 major commands and more than a hundred special activities at home and overseas.

to see the nine percent base-of-choice figure grow fat and occupy a lot more room on the chart.

Since the personnel assignment business deals primarily with the variable factor of military requirements and the wholly unpredictable factor of people, the goal of perfection lies far beyond reach. It will never be possible to move all of the men and their skills in accordance with their desires. But somewhere up ahead there is an optimum figure to shoot for. The airman in the field can help the situation considerably, now, by applying a little logic when making his selection of base of choice.

Take the case of the SAC jet-engine mechanic who dreamed while overseas of spending his Saturday nights on Times Square. So he elected Mitchel Air Force Base, New York, as his first choice when putting in for reassignment. How much chance does he stand? Mitchel belongs to the Continental Air Command, and ConAC is concerned primarily with the supervision of Air Force Reserve and Air National Guard units. It is this kind of thinking that causes people to wind up away over in the righthand column along with Sergeant Brickdust—assigned by AFSC.

It may be a surprise to some to learn that this sort of thing occurs quite frequently. Selections come in for bases that have long since been deactivated, or which cannot use the particular skills offered because they have been switched from one command to another.

Part 3 of AFM 11-4—Air Force Directory of Addresses—lists the name and location of every Air Force base and station in the ZI and the parent major command for each. By consulting the manual—or asking the personnel officer to consult it—the prospective returnee can at least determine if his base of choice is engaged in the kind of business he is trained for.

Of course there are many skills—particularly in the support fields, which can be utilized almost everywhere, and many selections for base of choice are made by airmen on the basis of climate, proximity to large cities, or even because of good hunting or fishing in the chosen area. But since air bases are established at particular places for different reasons entirely, the number of airmen applying for certain areas is altogether out of proportion to existing Air Force facilities.

Thus, more than nine percent of returnees put in for Florida, which contains only about five and a half percent of the Air Force strength. More than eight percent want to go to New York where less than five percent of the Air Force is located. On the other hand, about 20 percent of the Air Force is stationed in Texas, but only 5.2 percent of the people want to go there. That's the story the statistics tell.

The work of the people in PMP-2 is of obvious importance to the orderly functioning of Air Force units all over the world. It's a big job, but the viewpoint of the men who actually make the assignments can never be described as detached or distant. All airmen assignments are made by enlisted men; warrant officer assignments are made by a warrant officer. Every one has been through the mill and knows how it feels to wait with fingers crossed for the assignment to come in. There are more airmen assigned for duty with PMP-2 than in any other division in Headquarters, USAF.

Colonel Sidwell says, "There can be no guarantee that everyone will be made happy with his assignment, but everybody gets a fair shake."

After all, in the last analysis, someone's got to go to Windswept, Sarge.

inside the front cover of your July issue. I flew a Spit *in combat during WW II and have always had a soft spot in my heart for this fine plane.*

Seymour Feldman
Albuquerque, N. Mex.

★ ★ ★

PICTURE PROOF

Sir: *After reading the article* The Art of Writing Backwards *in the July issue, I thought your readers might be interested in a picture showing how the subject product looks.*

Lt. Thomas W. Leavitt
Oklahoma City AFS, Okla.

See cut.

★ ★ ★

QUIZ ANSWERS

Sir: *In the quiz* Where in the World Have You Been? *which appeared in the July issue, you refer to Splinter City. I was stationed at Wright-Patterson AFB in 1946 and again in 1948-49 and never heard the area in question referred to as anything but Wood City.*

TSgt. Calvin E. Mace
Shaw AFB, S. C.

The area in question may well have been referred to as Wood City at one time. However, the corruption, Splinter City, seems to be presently in use according to staff members who have visited there in recent months.

Sir: *Question 6 in the July quiz asks which Air Force base is named for a German physicist and indicates the answer is Hahn AB, Germany. I always thought that USAF bases were named for deceased Air Force personnel.*

A/2C Carl Buchanan, Jr.
Laredo AFB, Tex.

Airman Buchanan read the question improperly. No claim was made that the base was named for Otto Hahn, the German physicist who won the Nobel prize in 1944. The question simply asked, "which base bears the name of a physicist" so honored. The base adjoins the village of Hahn, Germany, and bears its name because of this fact.

★ ★ ★

BROOKLEY INFO

Sir: *I feel that the information published in the July issue about Capt. Wendell Brookley could have been more complete. I was stationed with "Brook" at Brooks AFB, Tex., many years ago and am well aware of his many contributions as OIC of flying there.*

Robert C. Walker
Webb AFB, Tex.

Because of space limitations, we were unable to publish all the material available to us and selected that which we felt indicated his greatest contributions to USAF overall.

★ ★ ★

THE FEW EXCEPTIONS

Sir: *In the June issue, you published an article entitled* The Case of the Curious Career Field. *In it, you discuss the agents of OSI and note, "With only a very few exceptions, all of the latter (enlisted agents) hold rank in the top noncommissioned officer grades." Who are these few and what makes them so exceptional?*

A/1C C. J. Chapman
Sioux City AB, Iowa

According to information received from Management Division, Directorate of Special Investigations, four factors are considered in reaching such a designation. These men must have college degrees in law or accounting; be proficient in one or more foreign languages; have had prior investigative experience, either in a civilian or military capacity; and have previously served with OSI for at least one year in an administrative capacity and demonstrated during this period that they possess the high moral character and mental capacity desired of OSI agent personnel.

★ ★ ★

REG PROBLEMS

Sir: *First, allow us to extend our hearty congratulations for a continuing job well done.* THE AIRMAN *rates a monthly pat-on-the-back. However, if feasible, we would like to see a new department adopted. Would it be possible to list current changes in regulations somewhere in the magazine?*

SSgt. John J. Bender
SSgt. John L. Barger
Sheppard AFB, Tex.

Our limited size and frequency of publication precludes any attempt to list all regulation changes. It has been our policy, where possible, to include major changes in *Airman's World,* usually accompanied by an explanation of the changes.

★ ★ ★

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CORRECTIONS

Sir: *In the May issue of* THE AIRMAN, *on page 33, the cutline on the photo indicates that the 337th was sent to Taiwan on TDY from Hamilton AFB, Calif. This is incorrect. The 337th was from Westover AFB, Mass., and relieved the 82d which is based at Hamilton.*

SSgt. Anthony Chadwick
APO 224, New York, N. Y.

Sergeant Chadwick is quite correct. Our apologies to both units.

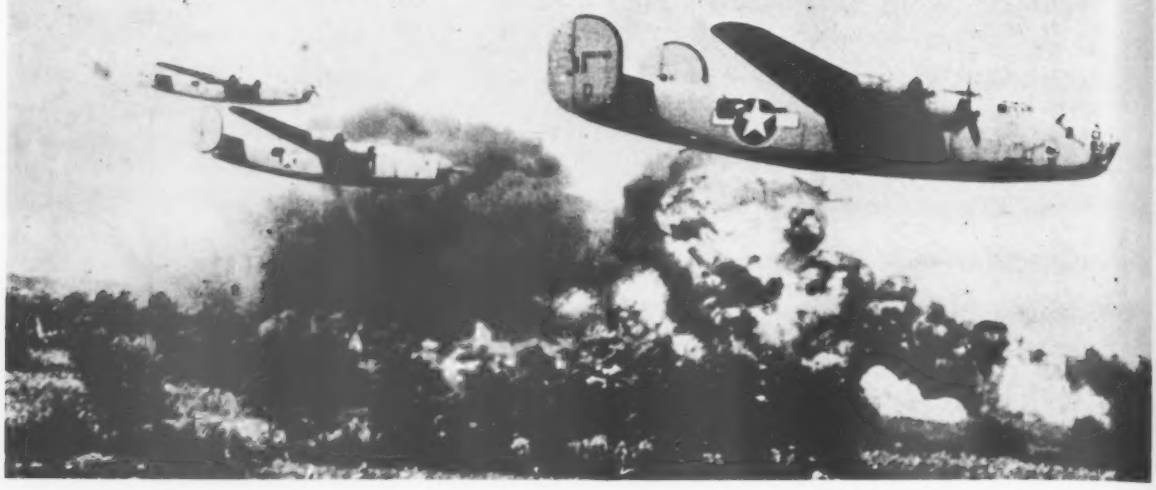
Sir: *In the June issue, on page 42, somebody goofed. The photo printed there shows the medical insignia on the patient's jacket reversed from its normal position. What happened?*

A/2C Leon Mazza
APO 845, New York, N. Y.

Apparently the negative was reversed when the photo was printed. Congratulations to Airman Mazza for his sharp eyes—and 50 lashes to each of our copyreaders for lack of a similar attribute.

In the Name of Congress

No. 13 IN A SERIES



Oil was the key to the German war machine. Consequently, its destruction meant slowing the enemy's mobility, and it became a . . .

PRIORITY TARGET

by SMSgt. Hal Bamford

Bucking like wild broncos, wave after wave of Consolidated B-24 *Liberators* swept into the billowing, black smoke clouds. Towering flames and delayed explosions filled the air. From time to time, one of the twin-tailed giants would hesitate, as if stunned by an unexpected uppercut, then cartwheel into the inferno below. Here and there, one would explode in midair as the edges of the holocaust licked at punctured gas tanks.

The date: August 1, 1943. The target: Oil refineries at Ploesti, Rumania. The attackers: Five groups of American B-24 bombers from the 8th and 9th Air Forces. The goal: Crippling the Axis main oil processing plants.

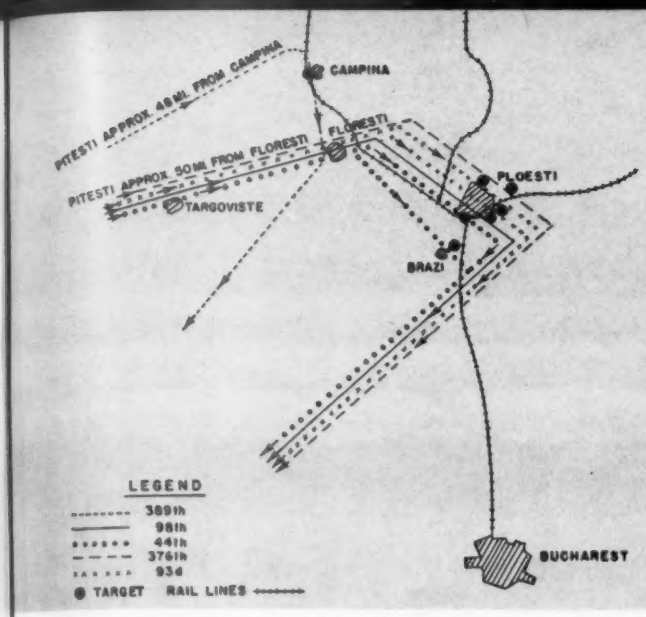
Shortly after dawn that morning, 176 bombers roared into the sky from Benghazi, North Africa. Ahead of them lay a hazardous 2,700-mile roundtrip, theoretically well within their 3,500-mile range. A total of 1,726 airmen, all but one Americans, manned the ships.

Later that same night, shortly after the sun had set, the first of these bombers began returning to North Africa. Almost without exception, those that made it were riddled from nose to tail. Dozens had been left at the target, and many others accomplished landings at neutral fields along the return routes.

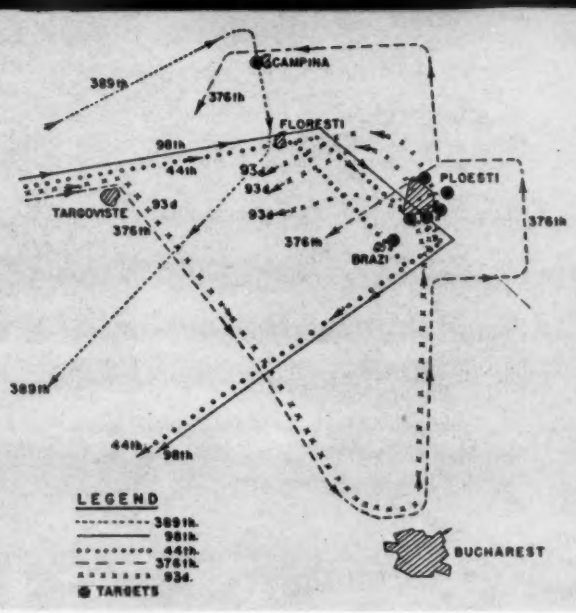
By midnight, planners began toting up the score of one of the most daring raids in USAF history. Before the story of Ploesti ended, five Medals of Honor were earned by participants—the highest number ever awarded for a single raid.

Ploesti's story is a complicated one, beginning for the Americans more than a year before the now-famed date of August 1, 1943. On June 12, 1942, thirteen B-24s of the little-known Halverson Detachment had struck the first American blow at what was listed as the number one Axis target in Europe. They had departed the British airfield at Fayid, near the Suez Canal, late in the evening of June 11. The results were negligible; losses were small.

Unfortunately, the nuisance raid warned the Axis that Ploesti could be reached from the south. As a result, defenses were tightened, and this former open road was strewn with roadblocks. The Germans could ill afford to leave Ploesti undefended for it was the major link in powering the *Wehrmacht, Luftwaffe,* and Grand Fleet, supplying almost a third of the oil requirements of the entire German economy.



Ploesti Attack as Planned



Ploesti Attack as Executed

Plans for the final mission seem to have been the brainchild of Maj. Gen. Jacob E. Smart, then a member of General Arnold's advisory council as a colonel. He recommended launching a low-level raid from Libya with a force strength of no less than 150 aircraft. After top level approval, the final plan was passed to Maj. Gen. Lewis Brereton, commanding the 9th Air Force, for execution.

On June 8, 1943, he held his first conference with the man he had selected to lead the strike—Brig. Gen. Uzal Ent, chief of the 9th Bomber Command.

First item on the planning agenda was to collect the necessary force. Because of the Sicilian campaign, only two 9th AF groups could be made available—the 376th and the 98th. The former was commanded by Col. Keith Compton; the latter by Col. John Kane.

Two other active and experienced organizations were selected from the 8th Air Force—the 44th, led by Col. Leon Johnson, and the 93rd, under the guiding hand of Lt. Col. Addison Baker. Finally, to round out the force, the England based 389th, as yet untried in combat, was also diverted to Benghazi. This unit was commanded by Col. Jack Wood.

On June 29, the three groups from 8th Air Force, without any indication of the exact nature of the special mission for which they had been withdrawn, took off from bases in southern England to join the other groups in the African desert. On July 20, group leaders, navigators, bombardiers, and pilots received their first detailed briefing. Practice now became the key activity.

Using whitewash and oil drums, USAF engineers marked out a practice area on the desert floor several miles south of Benghazi. The area included the contours of the entire seven assigned targets, five within Ploesti, one in the suburb of Brazi, just south of the city, and another in Campina, 20 miles northwest of the main focal point. (See chart.) Target forces were organized and the battle order formed.

Finally, on July 28 and 29, two fully coordinated practice raids were executed on the desert target with live 100-pound, delayed action bombs. In less than two minutes, the entire force had swept in, unloaded, and cleared the target area. The groups were now ready for the real thing but, unfortunately, the raid itself was not to be carried out with this same precision.

Precisely at 0700, August 1, the first aircraft of the leading 376th moved down the runway and into the air. Ten minutes later, the first casualty occurred when one of the aircraft of the 98th ran off the end of the runway, crashed, exploded, and killed all aboard.

ORDER OF BATTLE

*Target Force	Group	Leader	Target
No. 1	376th	Col. Keith Compton (General Ent aboard)	Romana Americana
No. 2	93rd	Lt. Col. Addison Baker	Concordia Vega
No. 3	93rd	Major Potts	Standard Petrol & Unirea Sperantza refineries
No. 4	98th	Col. John Kane	Phoenix Orion & Astra Romana refineries
No. 5	44th	Captain Kelliner (Col. Leon Johnson aboard)	Columbia Aquila
No. 6	44th	Captain Diehl	Brazi (outside Ploesti)
No. 7	389th	Col. Jack Wood	Campina (outside Ploesti)

* Battle Order
TF 1, 5 waves, 6 planes each; TF 2, 3 waves, 6 planes each, 1 wave of 3 planes; TF 3, 5 waves, 3 planes each; TF 4, 4 waves, 10 planes each, 1 wave of 6 planes; TF 5, 6 waves, 3 planes each; TF 6, 3 waves, 6 planes each; TF 7, 10 waves, 3 planes each.

Lt. Col. Addison E. Baker

Col. John R. Kane

Maj. John L. Jerstad

By 0740, 176 aircraft were airborne and were forming up for the long haul. After another 10-minute interval, a second aircraft, this one afire, skidded out of the formation. It managed to return to the mainland, but crashed on landing killing eight of the 10 aboard.

In all, 11 aircraft aborted on the outgoing leg, one was scratched before takeoff, one crashed on takeoff, and two others before reaching the European coast. The strike was reduced to 163 effective sorties.

As they crossed into Yugoslavia, pilots were forced to climb to top the mountain range which confronted them. Some elements chose to climb above the 15,000-foot cumulus clouds which had built up above the peaks; some chose to fly under them. Wind differentials, existing at the varying altitudes, threw the strike into confusion. The four high groups broke out over Yugoslavia intact, although loosely grouped because of the double passage through the cloud bank. Colonel Kane's fifth group was nowhere in sight. The time was just past 1330.

The leaders spent a few brief minutes regrouping, and still on schedule, headed for their IP at Pitesti. Unfortunately, only two of these four groups moved as planned—the 376th and the 93rd. The 44th and the 389th continued to orbit in their regrouping efforts. While still thus engaged, Colonel Kane's 98th was sighted to the south and the two already-tardy groups fell further behind the leaders as they waited for him to take his place as the number three unit.

As a result of this confusion, the two lead elements had gained a 20-minute lead over the three trailing organizations.

Although this was bad enough, it was followed by a second blunder of major magnitude. The second IP was scheduled to be Floresti, lying northwest of the target area. Southwest of Ploesti, along the selected line of approach, was the town of Targoviste, similar in many respects to the selected IP.

Colonel Compton, flying the lead aircraft with General Ent aboard, made his turn at Targoviste, 50 miles before reaching Floresti, and headed down the railroad at treetop level, straight for Bucharest. Colonel Baker's trailing 93rd, despite some doubt, followed close behind. It was not until they had reached the outskirts of the Hungarian capital that the units realized they were off course. By now, defenses all over Rumania had been alerted.

The immediate reaction was to attack from the south. Compton's 376th turned toward the target, but before reaching Ploesti, they again changed, turning east to avoid the city, then to return over the target from the northeast. Now, however, Baker decided to go straight into Ploesti from the south.

It was during this daring run that the colonel lost his life. The citation which accompanied his Medal of Honor describes the action.

For conspicuous gallantry and intrepidity above and beyond the call of duty in action with the enemy on August 1, 1943. On this date he led his command, the 93rd Heavy Bombardment Group, on a daring low-level attack against enemy oil refineries and installations at Ploesti, Rumania. Approaching the target, his aircraft was hit by a large calibre antiaircraft shell, seriously damaged, and set on fire. Ignoring the fact he was flying over terrain suitable for a safe landing, he refused to jeopardize the mission by breaking up the lead formation and continued unswervingly to lead his group to the target upon which he dropped his bombs with devastating effect. Only then did he leave formation, but his valiant attempts to gain sufficient altitude for the crew to escape by parachute were unavailing and his aircraft crashed in flames after his successful efforts to avoid other planes in formation. By extraordinary flying skill, gallant leadership, and intrepidity, Lt. Colonel Baker rendered outstanding, distinguished, and valorous service to our Nation.

As the 376th began their drive into Ploesti from the northeast, complete confusion reigned. One group was now attacking from the south; one from the northeast;

Lloyd H. Hughes

Gen. Leon W. Johnson

Outlined against billowing black smoke-clouds, a Convair B-24 appears to be isolated over the Astra Romana refinery during the Ploesti raid.

and two would follow within minutes from the originally-planned northwest approach. General Ent, seeing that the existing confusion could only foster further confusion, broke radio silence and allowed the planes of the 376th to bomb "targets of opportunity."

Meanwhile, Target Forces 6 and 7 were the only units not caught up in the general melee. The less experienced 389th had hit the target at Campina with amazing accuracy, made their turn, and begun their run for home. Also, the trailing elements of Johnson's 44th struck with better than average success at Brazi, and moved southward.

Almost simultaneously, Colonels Kane and Johnson bored in on the main targets from the northwest, determined to carry out their mission despite the fact that the thoroughly alerted defenses and burning and exploding refineries only doubled and tripled the already high risk. Because the 376th had bombed at will, most of the 98th and 44th targets were already ablaze, but the two leaders unloaded despite this, striking where they felt their bombs would do the most good.

Now the long run out began. Confusion was still the order of the day as the *Liberators* swung off their targets. Huge losses had torn gaping holes in what should have been formations. Of the 163 aircraft which participated in the overall attack, 54 were lost in action. General estimates indicate that 41 went down in the target area, the balance crashed along the route home. At least 440 airmen died or were listed as missing in action; probably another 100 were interned in Turkey or taken prisoner by the Axis when their crippled aircraft quit short of their North African destination.

Despite the confusion, intelligence reports showed the target area to be approximately 40 percent destroyed. Under normal conditions such a percentage would have been considered more than adequate; however, later reports concluded that Ploesti had been operating with more than 40 percent of its capacity idle prior to the raid. Now, the idle refineries were placed in action, and little production was lost. In short, the only thing eliminated was the reserve which might offset another such raid.

In all, five Medals of Honor were awarded for heroism during the bloody fight—three posthumously. Colonel Johnson and Colonel Kane, both of whom survived, received this honor for their decision to strike despite the confusion which existed, and despite the fact that most historians agree that they would have been "completely justified in turning back."

In addition to Colonel Baker, who died leading his 93rd Group into the hell that existed, two other Medal recipients gave their lives.

Maj. John L. Jerstad, a member of the erring 376th, chose to drive on into the target despite the fact his aircraft had already been hit and was enveloped in flames. He disdained a pre-target crash landing, which would have been possible, and crashed in the target area after unloading his bombs.

Finally, Lt. Lloyd Hughes, a member of the 389th, also received a posthumous decoration for his galiantry over Campina. Hit repeatedly on his way into the target, his aircraft was streaming leaking gasoline as he swept in over the burning refineries. With full knowledge of the consequences, Hughes flew his plane into the inferno, and unloaded on the assigned target. He emerged, his left wing swept with fire, and attempted a forced landing as he cleared the area. However, the fire had advanced too far and the aircraft exploded, killing all aboard.

The five Medals brought the USAF total to twenty, 15 of which had been awarded for actions in World War II in which the United States had now participated less than 21 months.

BASELINE USAF

DRAMATIC SAVE

Nellis AFB, Nev.--A Colorado River adventurer owes his life to the skill of Lt. Ronald R. Riggs and his crew from this station's rescue unit.

Recently, Verne R. Read and his wife attempted to shoot the rapids of the treacherous river. An accident swamped the boat and washed the couple ashore to an isolated part of the canyon floor. Park Rangers, unable to reach the stranded adventurers, placed an emergency call to Nellis for aid.

Lieutenant Riggs, accompanied by SSgt. Monroe Taylor and medical corpsman A/1C Robert Finn, were airborne within minutes. An hour later they spotted the couple.

The pilot eased the helicopter down through unpredictable canyon drafts. Soon the injured man and his wife were loaded aboard the aircraft. Riggs then battled his way back to the canyon rim nearly 4,000 feet above.

Read, suffering from a possible broken back, was given emergency treatment at Nellis, then transferred to a hospital in nearby Las Vegas.

AUTHOR!

GRIFFIS AFB, N. Y.--A/2C Milburn J. Davis, Hq Sq, 4039th Strategic Wing here, was recently notified his book of juvenile stories, Smarty Pants, has been accepted for publication.

Airman Davis' stories are described by the base newspaper, Wave Guide, as "thoroughly entertaining and, at the same time, designed to point up a series of valuable moral lessons."

THIRD LAP

Chanute AFB, Ill.--An instructor in the Instructor Training Branch here is proving initiative is a major part of obtaining an advanced education.

MSgt. John Grotzinger, Hq Sq, 3345th Technical School, recently began working toward his doctor's degree in educational psychology at nearby University of Illinois.

His college studies began in 1953. The following year he earned an Associate in Arts degree. Since then he has completed work for a Bachelor of Science degree at the University of Omaha and, in March of this year, was awarded a Masters degree in psychology by the same school.

HIGHWAY SAVE

Andrews AFB, Md.--A/1C Don A. Bishop combined quick thinking and equally quick action in helping save the life of a fellow airman following a highway accident a short distance from here recently.

When Airman Bishop, a member of the ambulance emergency squad, arrived at the scene, the injured, A/2C Norman Knight, was just being removed from the wreckage. To all appearances, Knight was already dead. However, Bishop detected a slight pulse quiver. Noting the skin had turned slightly blue indicating a lack of respiration, Bishop pressed firmly on the injured man's chest. Throughout the trip to the hospital, the medic continued to apply artificial respiration.

Doctors credit his quick action with saving Airman Knight's life.

DEFENSE AND OFFENSE ARE INTERDEPENDENT...

Destroy or reduce the effectiveness of attacking enemy air weapons. Concurrently launch air counterblows against the source of the enemy's strength.